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Rock Products

CEMENT and ENGINEERING NEWS

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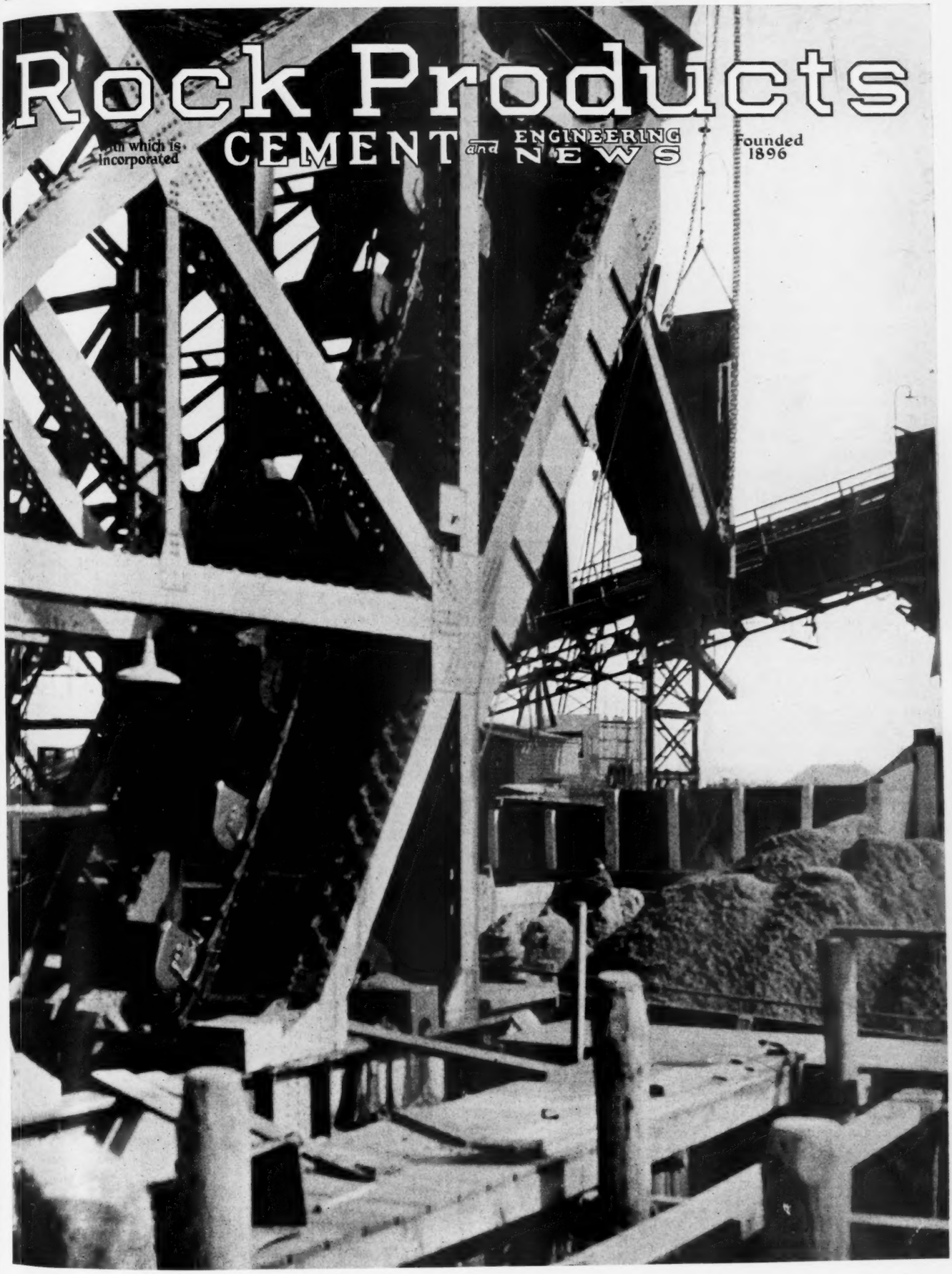


Manor plant of the Charles Warner Co.—A close-up of the building-sand elevator from the wooden dock on the outshore end of the caisson. Note the even loading of the sand on the barge under the chute

Novel Sand Separating and Recovery

Changes at the Manor Plant of the Charles Warner Co., Near Tulleytown, Penn., Introduce New Practice—Why Original Method Was Unsatisfactory

By C. S. Lenderman
Engineer, Charles Warner Co., Wilmington, Del.

A BIG STEP forward in the separating and recovery of sand was made at the Charles Warner Co.'s Manor plant, near Tullytown, Penn., during 1926, with the completion of a new sand separating and recovery system.

As described in the April 5 and May 3, 1924, issues of ROCK PRODUCTS, the raw material is dug up and loaded into hopper barges by the electric dredge "John W. Betelle." The barges are conveyed to the plant and their contents removed and elevated by a continuous bucket elevator to a sluice box where the raw material receives a copious supply of clear water and is carried by gravity through the scrubbers and screens. In the screens, which are jacketed, the material receives a further washing by use of spray pipes, and is separated, the ¼-in. material and dirty water dropping to the sand pump pit and the coarse aggregate flowing by gravity through the pebble or rinsing screens, where it receives additional washing and is then distributed by belt conveyor. The oversize goes to the crushers and the crushed product is delivered by conveyor to the barge of raw material, dropping directly in front of the main bucket elevator which thus rehandles the crushed pebbles for recirculation in the screens.

Original Method

The ¼-in. material and dirty water was pumped by a 16-in. heavy-duty dredging pump from the pump pit to the head flume over the two sand storage tanks (see Fig. 1).

In this flume was placed a perforated launder plate with ¾-in. by ⅛-in. openings that took out about one-half the water and the minus ⅛-in. sand from the main flow. This first material was dewatered in two 10-ft. Link-Belt sand separators, the sand dropping into the first sand storage tank. The balance of the flow, containing the coarse sand, minus ¾ in., with a properly graded proportion of the fines to make a correct concreting sand, was dewatered in two similar separators over the second storage tank. From these tanks, the respective sands were removed periodically by belt conveyors which ran out on the wharf to deliver the sand to the barges for transportation to the market.

The natural grading of the raw material made this system possible and satisfactory as to products. The market demands a graded concrete sand, minus ¼ in., including fines, and also a plastering or building sand that is minus ⅛ in. The raw material contained too much fines for a properly graded concrete sand, but by removing a portion of the fines, both sands were made simultaneously and satisfactorily. But in practice this system had several objectionable features, as follows:

Objections to Original Layout

(1) Occasionally the sand came in such quantity that it overloaded the dredging pump used to elevate the wash water and sand from the pump pit to the sand separators. This necessitated the temporary slowing down of the plant until the system cleared itself.

(2) The upkeep and replacement costs on the sand pump were excessive, even though this was a high grade manganese-steel fitted pump that gives excellent satisfaction in normal sucker dredge practice. The reasons for this failure are of interest to every sand and gravel man. Careful study of the situation developed the following causes of this failure:

(a) Manganese steel needs hard blows to keep it peened to insure best service. There were no heavy boulders or gravel to give this action. Accordingly, small channels or grooves developed rapidly

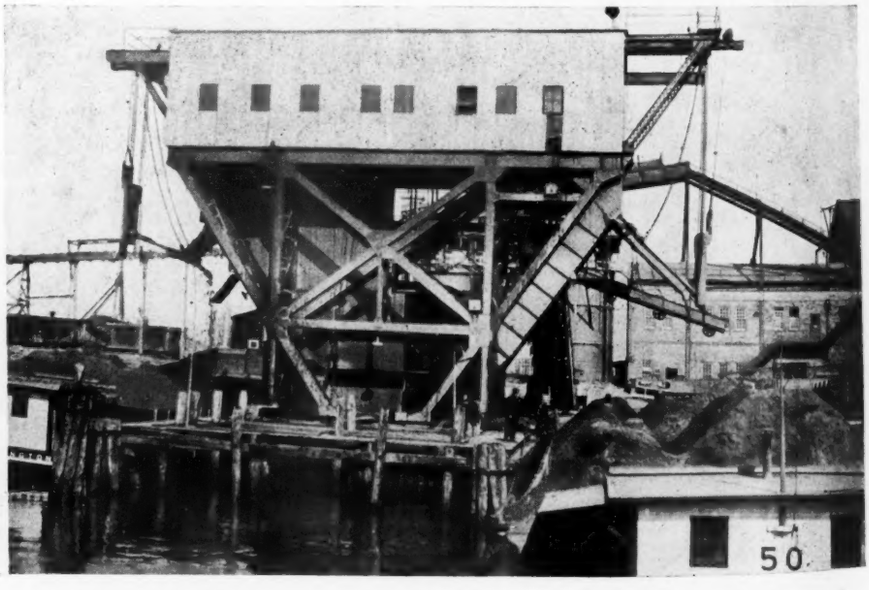
Editor's Note

THIS is a most unusual article. It discusses with the utmost frankness the shortcomings in the original design. These are described in such detail that other operators may profit from the experience gained at this plant.

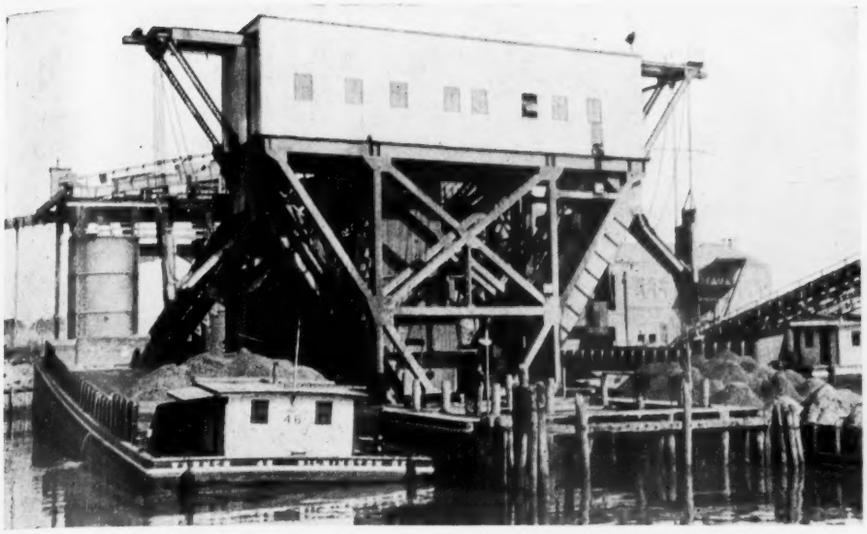
Such a thoroughgoing analysis of the defects in the original plant and their correction could only be written by an engineer who helped design and operate the plant from the beginning.

The author and his employers, the Charles Warner Co., are to be congratulated on their liberal and generous attitude in publishing such data as this article contains. It is in line with progress and prosperity for the industry as a whole, but unfortunately operators are often too sensitive about faults in their plant, or too jealous of knowledge gained by costly experience, to share such information with other producers.

—The Editors.



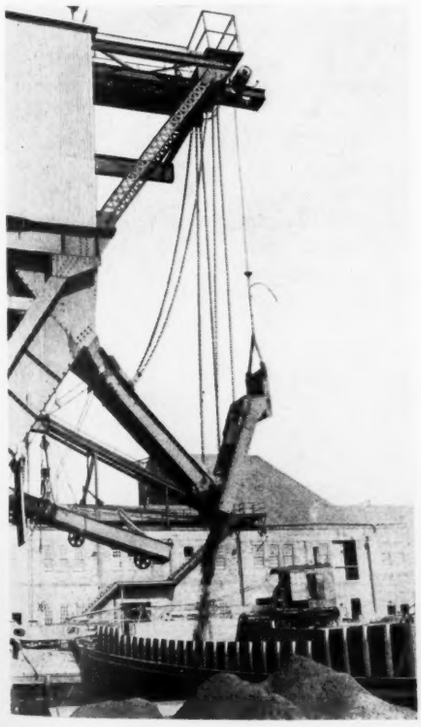
Sand reclamation structure from outshore end. The building sand elevator is shown discharging to the barge on the right and the concrete sand elevator to the barge on the left



Another view of the sand reclamation structure showing clearly the concrete sand barge loading chute. The vertical tank in the background with cones and head troughing above it are eliminated by the new system

wherever there was a slight weakness in the castings.

(b) In normal dredging practice, a large percentage of the solids are plus ¼ in., so that the solids pass through without attempting to circulate back



Close-up of the building sand unloading chute. The electric hoist on the out-rigger above controls the hinged chute

through the wear rings to the suction side of the pump. In this particular installation, practically all of the material tried to follow the water leakage through the wear rings, so that the erosion on the side liners and wear rings was enormous. It is believed that there would have been little trouble if the sand had been minus ⅛ in. or if the pump had handled gravel of plus ¼ in., but the enormous percentage of sand running plus ⅛ in. and minus ¼ in. was very hard on a pump of this type. It became a disc grinder for this size of material.

(3) A further objection to the old system was the inability of the sand separators to recover all the sand wanted. These separators worked with a normal efficiency that would have been satisfactory in a majority of plants, but the market demands were such that more sand was wanted, and this was being lost down the waste water flume. Finally a fifth separator was installed to help out, but this did not make an appreciable saving. The plant was using approximately 9000 gal. of water per minute and the quiet handling of this enormous quantity of water was a serious problem.

(4) The sand in the storage tanks was not sufficiently dewatered to make easy handling on belt conveyors. There was a constant spill, necessitating a continuous clean-up gang. The tanks themselves had "filter bottoms" and drained a great deal of water on their own account. But in running the sand out on the belts, there would be occasional breaks of saturated sand which the conveyors could not hold.

Details of New System

To eliminate these conditions the new separation and recovery system was conceived, designed and installed, and the results from its operation are very gratifying.

The new system involves the following essential features:

(1) A tight cofferdam, divided by a bulkhead into two parts, erected out at the end of a pier in the outer or loading basin.

(2) A flume for delivering the sand and water from the screens in the plant to this caisson, or cofferdam.

(3) Splitting the sand and water flow by perforated launder plates to deposit coarse sand in one section and fine sand in the other section.

(4) Removal and elevating of sand by continuous bucket elevators for delivering into barges for shipment.

(5) Pumping the dirty wash water to waste after all desired sand was settled out.

(Fig. 1 shows the general layout diagrammatically.)

The standard barge of the company measures 120x30x10 ft. and carries 750

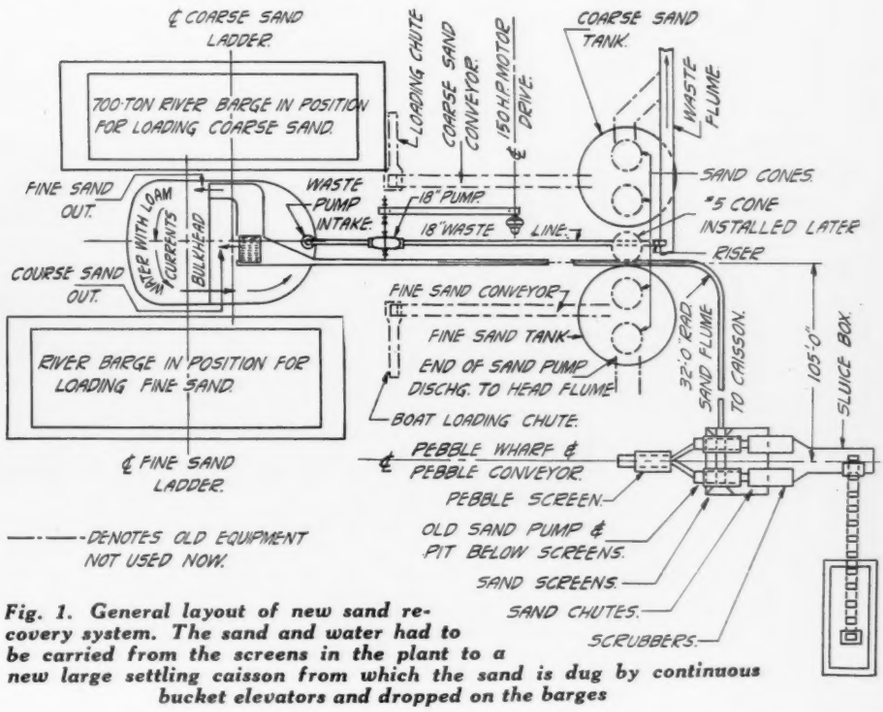


Fig. 1. General layout of new sand recovery system. The sand and water had to be carried from the screens in the plant to a new large settling caisson from which the sand is dug by continuous bucket elevators and dropped on the barges

tons. The cofferdam was located sufficiently far out from the shore to permit loading the full length of a barge without turning or "winding," as the river men call it.

The caisson or settling pit is constructed of Bethlehem Steel Co.'s 14-in. by 35-ft. steel arched, interlocking sheet-piles of the shape and dimensions as shown in Fig. 2. The cross bulkhead was provided to separate the fine sand and coarse sand bays and consists of 14-in. by 25-ft. sheet-piling. The 5-ft. by 5-ft. rectangular opening at one end permits the extension through of the fine sand trough and at the other end the reversed flow of dirty water toward the waste-water pump intake.

On account of the location of the caisson in tidewater, it was necessary to establish its top at some level above normal high tide, in order to maintain a constant operating water level within and to provide against high storm levels and spring freshets. The 35-ft. piles in the caisson were driven into 15 ft. of clay with top elevation at 104.0. The bulkhead piles were placed with tops at 101.0 (see Fig. 5).

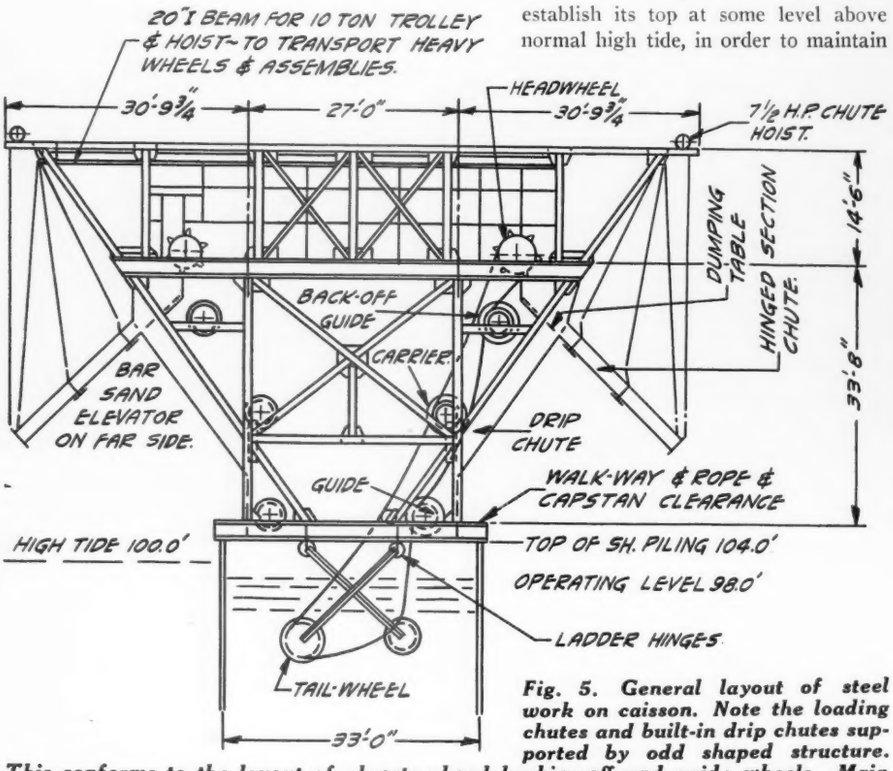
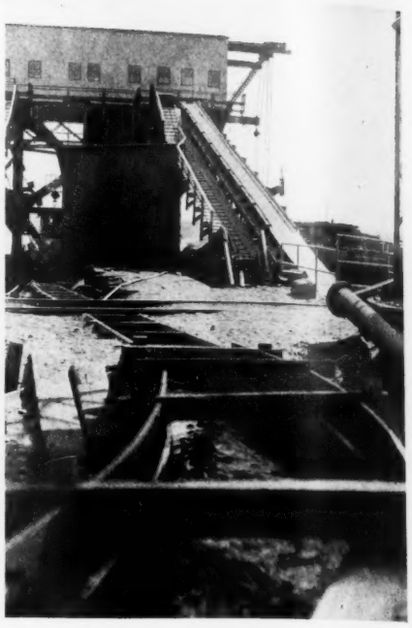


Fig. 5. General layout of steel work on caisson. Note the loading chutes and built-in drip chutes supported by odd shaped structure. This conforms to the layout of elevator head backing-off and guide wheels. Main columns set in three feet to provide walkways and boat-handling wharf space. Note the 20-in. I-beam located in center line of each bay for transporting heavy wheels and assemblies



Rectangular wooden flume thrown together in rough manner which was so effective that it will be retained in place. The inclined belt conveyors at the background are eliminaed by the new system

The tops of the caisson piles are tied together inside and out with 12-in. ship channels riveted to each pile (see Fig. 2). These channels extend around the entire caisson with the exception of 20 ft. along the blunt end of the bilge, at which point there is no imposed load.

Special piles were fabricated, placed and filled with concrete to produce a concrete pile 13 in. wide by 8 ft. long inside the caisson and under the ladder heels. These piles were poured to steel bearing height to afford additional bearing surface and to stiffen the piling under the bucket digning thrusts and strains. The J. H. Terry Co. placed the caisson, fender, racks and

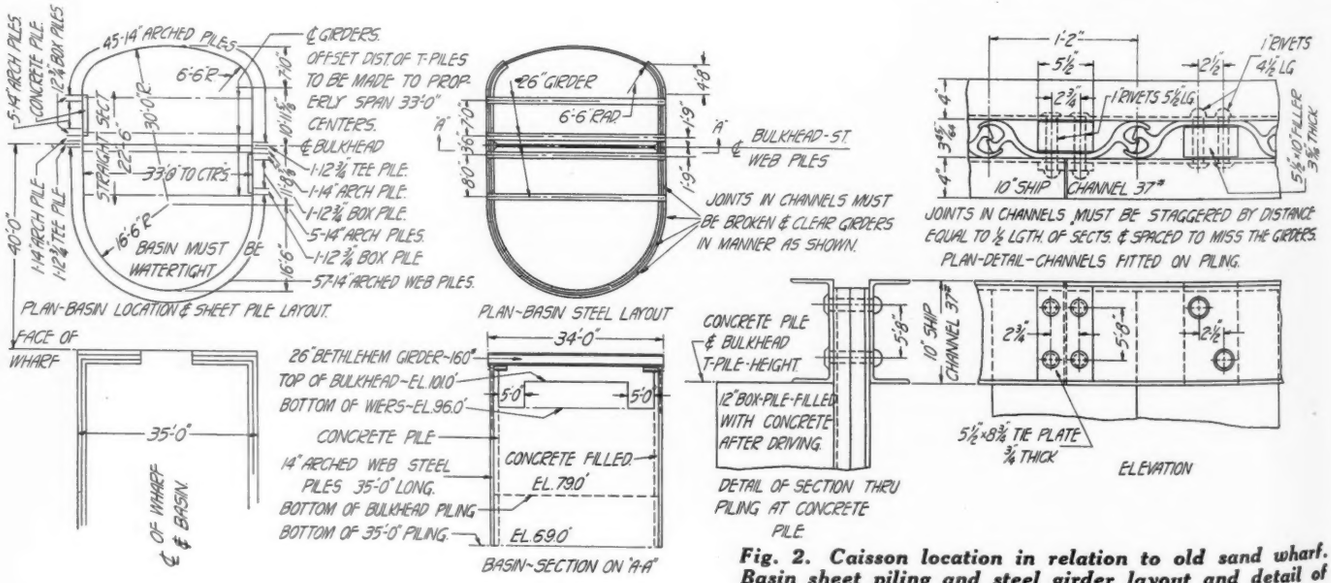


Fig. 2. Caisson location in relation to old sand wharf. Basin sheet piling and steel girder layout and detail of ship-channel rim connections to the sheet-piling

wharf, and all incidental fabrication.

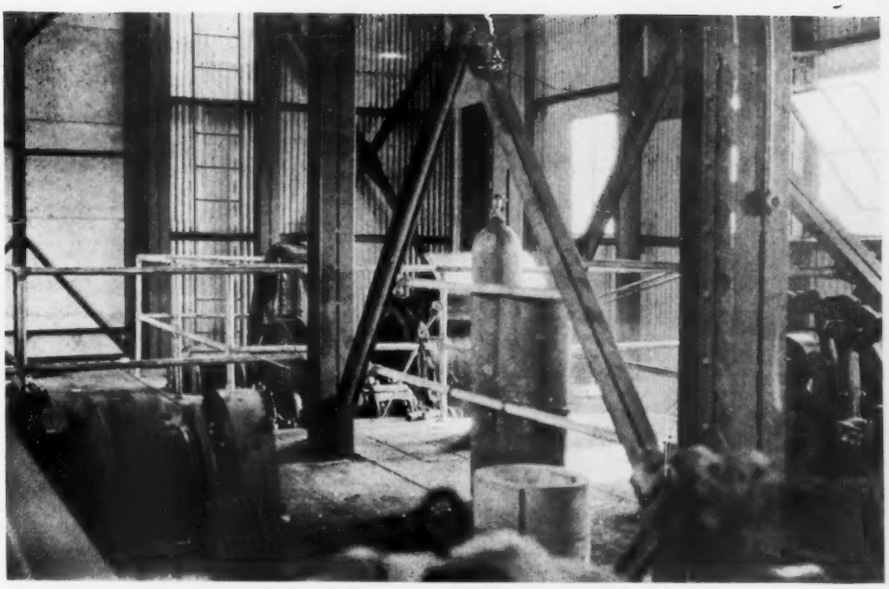
In order to afford passageways and working space along the structures, it was necessary that the main columns at main floor height be set back from the edge of the caisson at least 3 ft. (See Fig. 5).

On account of these and other problems and the necessity of properly distributing the loads and strains in the superstructure, the design of the steel was assigned to the Wm. Steele & Sons Co., of Philadelphia, Penn. The Belmont Iron Works, of Philadelphia, furnished and erected the steel; and the strength and rigidity of the entire structure is an accomplishment of which all three contracting companies can well be proud.

Sand-Handing Equipment

The unloading elevators are of the double-chain, digger-bucket type with head or horn drive wheel, backing off guide, hinged stiff-leg digger-end with tail wheel at the digging point.

The buckets, chain and wheels were salvaged and reconditioned from the company's dredge "Jackson" outboard and inboard elevators.



View from the inside of machinery house, showing the buckets coming up and over the horn wheel in the background. In left foreground is the electric ladder hoist which controls the concrete sand ladder. In the right foreground can be seen the solenoid brake mechanism on the concrete sand elevator drive motor

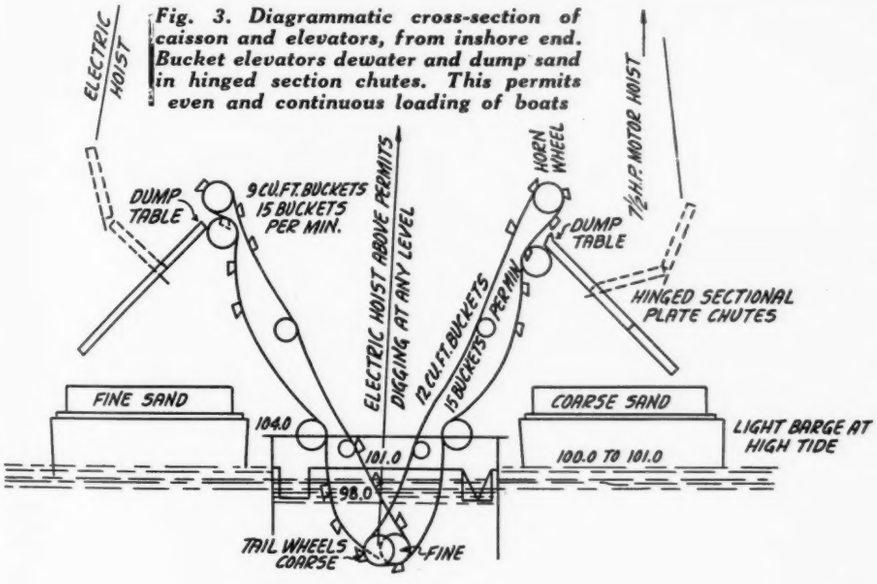


Fig. 3. Diagrammatic cross-section of caisson and elevators, from inshore end. Bucket elevators dewater and dump sand in hinged section chutes. This permits even and continuous loading of boats

The coarse sand elevator is made up of 28 buckets of 12-cu. ft. capacity and operates at a speed of 15 buckets per minute. It is driven by a 100-hp. motor through a 14-in. belt and two sets of gears with shear pin, elevating the sand from the deepest dig a total distance of 62 ft. The buckets are equipped with manganese steel digging lips, and all chain parts are manganese steel. The chain is of the Smoot design of 14⅜-in. pitch.

The fine sand elevator is of the same type as the coarse sand ladder, with 34

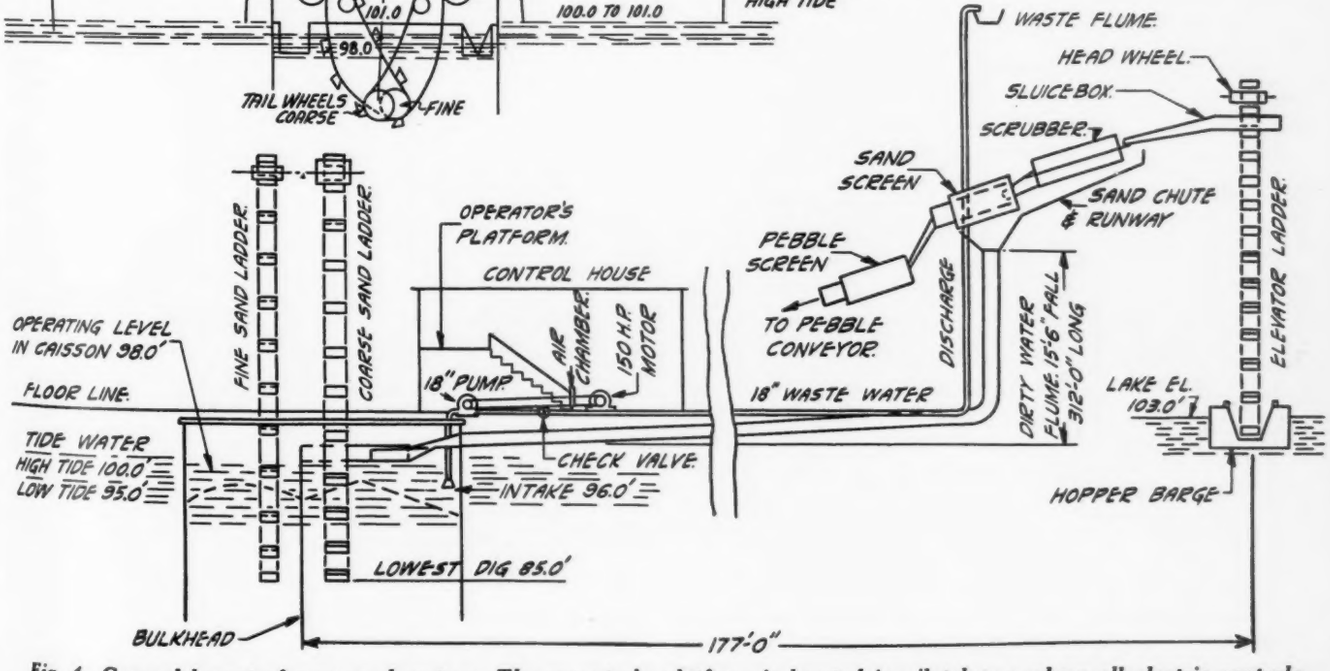


Fig. 4. General layout of new sand system. The operator's platform is located in pilot house where all electric controls are conveniently placed. This arrangement also provides the operator with a complete and continual view of the operation

buckets of 9-cu. ft. capacity, operating at a speed of 15 buckets per minute. It is driven by a 40-hp. motor through a 14-in. belt and two sets of gears with shear pin lifting the sand from the deepest dig through 59 ft. The chain is of the same design but much lighter, with a 12-in. pitch.

The stiff-leg digger-ends of both ladders are raised and lowered by means of Mead-Morrison hoists, equipped with 15-hp. motors. These motors together with the elevator drive motors are equipped with Westinghouse solenoid brakes. Fig. 3, a cross-sectional view of the caisson and elevators, shows how the elevators cross each other. This tends to equalize the loads and digging strains on the steel structure and caisson.

To flow, the minus ¼-in. material and dirty water from the highest possible feasible level under the sand-screen jacket in the main plant to the caisson, it was necessary to design a flume of sufficient cross-sectional area to carry 8000 gal. of water per minute plus approximately 8.5 tons of sand, plus all the washings from the scrubbers and screens.

This mixture then contained 15% of sand plus the washings. The overall length from the collecting chutes under the screen jackets to the caisson is 310 ft., including a 90-deg. bend on a 32-ft. radius. The greatest fall possible was 15½ ft., so that the slope established was 1 ft. in 20 ft., a 5% grade.

Details 310-Ft. Flume for Sand

The first flume designed and installed proved to be a failure, and it is believed that the experience with it will be of interest to other plant operators.

This flume was made up of 20-in. outside diameter black steel standard pipe, cut in half along the longitudinal axis. Extensions 10 in. in height were welded on either side.

The lengths for the curved section of the flume were bent to the proper radius before they were split in halves and the flanges applied. Sheet rubber gaskets were used at the flanged connections and the joints bolted up tight as in usual pipe fitting practice.

When the mixture was turned into the flume for a tryout, it appeared as though the installation was a success, for there was apparently sufficient velocity and no banking over at the bend.

After a short run, however, the stream level started to rise at point approximately 25 ft. from the head-end of the flume and with an accelerated building-up action soon overflowed the sides. Upon stopping the bucket elevator (which unloads the raw material) it was found that the clear water cut away the dam and cleared the flume in one minute.

A study of this damming action developed the fact that the coarsest sand settled in the center of the curved bottom where water velocity was least, and this acted as a nucleus for building up a shoal.

Granted that the diagnosis was correct, this action could not take place in a square trough with flat bottom. Any incipient deposits would be cut away by rush of water on the side. Furthermore, the depth of the stream would not be as great as at the middle of the half-round

The excellently designed and shop-made steel flume which failed to do its job

section, and a greater velocity in the bottom strata of the stream would be gained.

Accepting these premises, a square, open-top trough was constructed, inside measurement 27 in. by 27 in., and installed, and it solved the difficulty.

Removing Surplus Fine Sand

The removal of the surplus minus ⅛-in. sand from the coarse sand to produce a marketable concrete sand was accomplished by installing perforated launder plates with ¾-in. by ⅛-in. perforations in an expanded section of flume at the end of this open-top square flume and inside of the caisson. The slope of this wide section is 5 deg., or a natural beach incline, in order to de-aerate the mixture and thus reduce the turbulence as much as possible prior to the passage of the material over the screen plates.

The screen plates are hinged at one end so that they can be raised or lowered to control the percentage of fines removed and to correct the various conditions imposed by the various deposits of raw material.

The fine sand passes through the plates and flows by trough through the bulkhead to the fine sand bay (see Fig. 1). The coarse sand flows across the plates and into the concrete sand bay.

The removal of the dirty water from the cofferdam is done by the same 16-in. digging pump which formerly elevated the sand and water in the plant. It is located at wharf level with the intake on the basin center line and 2 ft. inside the inner curve of the cofferdam. The power required is much less than formerly and the wear and tear on the pump will apparently be negligible.

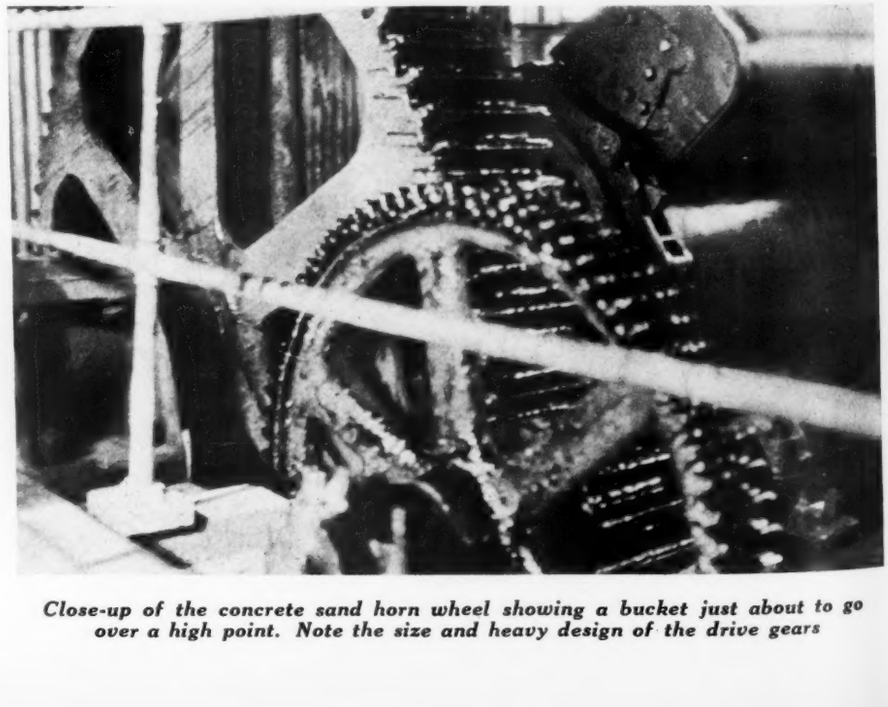
The water as it discharges from the fine sand trough through the division bulkhead crosses the fine sand elevator tailwheel or digging point and assumes the course as indicated by the arrows in Fig. 1. The current of this flow of dirty water gradually decreases as it approaches and passes through the bulkhead opening where it meets the back wash from the coarse sand elevator.

The combined waste waters at this point are pulled toward the pump intake and are pumped through an 18-in. pipe line to the waste-water flume and delivered to the waste piles.

Barge Loading Details

The chutes which deliver the sand from the dump tables to the barges are of the hinged section type, raised and lowered by 7½-hp. Sheppard-Electric, double-acting hoists and which permit a nice even loading across the barge decks (see Figs. 3 and 5).

The movements of the barges are controlled by American Engineering Co. 10-hp. electric capstans, one on either side of the



Close-up of the concrete sand horn wheel showing a bucket just about to go over a high point. Note the size and heavy design of the drive gears

wharf. The chute and capstan controls are so located that one operator can take care of the loading of both sands.

Special mention should be made of the diagonal bracing of the steel structure overhang in the cross wharf sections (see Fig. 5). These members not only serve to distribute and brace the loads but also carry the loading chutes, the backing off guides and carriers, and the well designed drip-chutes which catch all the elevator drip and delivers it back to the caisson.

With the exception of the chute and barge motor controls, all controls of electric equipment on this system are placed on an operator's platform, conveniently located for his requirements. This platform is in the outshore end of the pump house (see Fig. 4) directly over the waste-water pump and 7½ ft. above the wharf.

The building at the platform end is of the pilot-house type, having windows on all sides, so that the operator is constantly confronted with a complete view of all his equipment and the surrounding conditions.

Advantages of New System Summarized

The advantages and savings gained as a direct result of this system and method can be summarized under four heads, namely: (1) Labor; (2) conveyor belt; (3) cold-weather operation and equipment protection; (4) fine sand.

(1) This entire system requires three operators, consisting of control operator, boat-loading operator and an oiler (who also acts as boat-loading helper). The old system required over and above these operators, 215 man-hours per week for miscellaneous work of cleaning up, etc.

(2) The two conveyor belts which conveyed the sand from storage bins under the cones to the boats have been eliminated. One belt was 30 in. wide by 324 ft. long and the other 36 in. wide by 328 ft. long. The two belts cost approximately $3,000, and it can be realized that quite a saving in repairs and replacements was made at this point.

(3) Not only the labor expended for the steaming or thawing out of the conveyors during freezing weather is saved, but also the operating time lost through interruptions caused by freezing up of conveyors, belts blown off pulleys by winds, belt tears, etc. The new system is a built-in and protected one, and is little affected by freezing weather and storms.

(4) The most important saving brought about by this system is the additional amount of fine sand recovered which formerly flowed down the waste flumes. This increased fine sand tonnage is dependent to some extent on the type of raw material being treated in the plant.

During these periods when the dredge is in a fine sand location the increased fine sand recovered reaches between 400 and 500 tons per 10-hour shifts. This figure may be decreased or increased over a longer period of operations, as this system has been in use only a short time in comparison with the old displaced system.

It is interesting to note that the results of the pump discharge water tests show the amount of fine sand retained on a 100-mesh screen to be less than ½% by volume. This increase in fine sand tonnage recovered affords the plant two advantages: (1) It gives a more flexible mixing of fines in the coarse sand to meet the various trade specifications without reducing the former fine sand production, and (2) it decreases the space filled daily by the waste piles and consequently prolongs the life and location of the present waste flumes.

The company is well pleased with the results obtained from this installation.

Branding Silica Sand

THERE are many producers of silica sand in the Ottawa, Ill., district but only one so far as we are able to tell who advertises and distributes his product under a distinctive brand. The accompanying illustration, taken from a trade journal advertisement, shows the registered trade-mark of the Standard Silica Co., who operate several plants at Ottawa, Ill. The "Blackhawk" brand covers the entire line of sand blast, core, furnace bottom and steel molding sands of the company. Some of the other silica sand producers would do well to adopt a trade name, for there is little doubt that with a good product, an identifying name creates further sales.

Branding sand—a recent development in the merchandizing of silica sand

Fluorspar Industry, 1926

AS was to be expected in a year in which there was a record production of steel, the fluorspar industry did a larger volume of business in 1926 than in 1925, according to a statement prepared by Hubert W. Davis of the United States Bureau of Mines, Department of Commerce. The increase of 13% in shipments made by domestic producers, however, did not keep pace with the imports of fluorspar, which increased 55% over 1925 and are largest on record.

The fluorspar shipped from mines in the United States in 1926 amounted to 128,657 short tons and was valued at $2,341,277, as compared with 113,669 tons, valued at $2,052,342, in 1925. Thus there was an increase of 13% in quantity and 14% in total value as compared with 1925. Illinois, Colorado and New Mexico each shipped less fluorspar than in 1925, but Kentucky not only shipped the second largest quantity ever recorded for that state but for the second time since 1904 the shipments exceeded those of Illinois.

The reported shipments of fluorspar to manufacturers of steel, glass and enamel and sanitary ware were more than in 1925 and the quantity exported was twice as much as in the preceding year.

The general average value per ton f.o.b. shipping points for all grades of fluorspar in 1926 was $18.20, which is only slightly higher than the average for 1925—$18.06.

According to the reports of producers the stocks of fluorspar at mines or at shipping points on December 31, 1926, amounted to 17,912 short tons of gravel fluorspar, 1987 tons of lump fluorspar and 832 tons of ground fluorspar, a total of 20,731 tons of "ready-to-ship" fluorspar. In addition there was in stockpiles at mines at the close of 1926 about 48,000 short tons of crude (run-of-mine) fluorspar which must be milled before it can be marketed and which is calculated to be equivalent to about 28,000 tons of merchantable fluorspar. These stocks compare with 22,551 tons of "ready-to-ship" fluorspar and 44,335 tons of crude fluorspar on December 31, 1925.

Noteworthy features of the imports of fluorspar in 1926 are the importation from Spain, a new source, the increase of 340% in the imports from France, the resumption of imports from Canada and the decrease of 68% in the imports from Italy. The total imports of fluorspar into the United States in 1926, amounting to 75,671 short tons, represent an increase of 55% over 1925 and are the largest ever recorded. The imports in 1926 are equivalent to 59% of the total domestic shipments of fluorspar.

FLUORSPAR SHIPPED FROM MINES IN THE UNITED STATES, 1925-1926, BY STATES

State	1925 Short tons	1925 Value Total	1925 Value Average	1926 Short tons	1926 Value Total	1926 Value Average
Illinois	54,428	$1,024,516	$18.82	53,734	$1,012,879	$18.85
Kentucky	44,826	833,794	18.60	62,494	1,167,129	18.68
Colorado	11,776	153,707	13.05	12,429	161,269	12.98
New Mexico	2,639	40,325	15.28			
	113,669	$2,052,342	$18.06	128,657	$2,341,277	$18.20

Rotary Kilns vs. Shaft Kilns for Lime-Burning*

A Comparison of Installation and Operating Costs of Both Types of Lime-Manufacturing Plants

By Richard K. Meade
Consulting Engineer and Chemist, 10 W. Chase St., Baltimore, Md.

IN this discussion of the relative merits of shaft and rotary kilns, the author intends to submit no brief for either type. He has had many years' experience in the construction and use of both styles of lime kiln. During the past year he has built a number of shaft kilns and is now building a rotary kiln plant in New Jersey. Nor does he intend to cover fully the subject of lime-burning in these two types of kiln, but rather to indicate the most striking points of comparison between the two.

Suitability of Kiln to Raw Materials

All shaft kilns require that the stone be in pieces ranging in size between about 4 and 10 in. With the rotary kiln the stone should not be greater than 2.5 in. and the kiln will successfully burn dust and even such an impalpable material as alkali waste. In general, the rotary kiln will burn the stone more uniformly if it is fairly regular in size. It is therefore the practice at some works to sort the stone into sizes by means of a screen, store the stone in bins, and burn each size separately.

Apparently, there are no limestones suitable for burning in a shaft kiln which are not also suitable to burning in a rotary kiln, provided they are properly prepared for the latter by means of crushing. On the other hand, there are numerous limestones which cannot be burned in a shaft kiln but which can be burned in a rotary kiln. With a shaft kiln, if the stone is too small the smaller material works its way into the crevices between the larger stones and chokes the draft, not only decreasing materially the output of the kiln but also causing irregular burning of the lime.

For this reason the shaft kiln cannot be economically employed for burning quarry spalls or stone smaller than about 6 in. in diameter, for burning stones which when heated decrepitate and fall to small pieces, or for burning very soft, chalky limestone which has not the necessary crushing strength to hold its shape in the kiln.

During the preparation of stone for the shaft kiln (or for furnace flux) large quantities of small stone (spalls) are often produced. The disposal of this material, particularly during certain seasons of the year and at certain quarries, is a problem. Several manufacturers have therefore installed rotary kilns in connection with their shaft kilns for the express purposes of burning these spalls.

Richard K. Meade

Certain limestones cannot be burned satisfactorily in a shaft kiln because they fall into small pieces when the heat strikes them. In some cases this action is very marked, the stone being reduced amost to dust. Good examples of this are the highly crystalline limestones found at North Adams and other points in northwestern Massachusetts and in the neighborhood of Franklin Furnace, N. J., some of the purest ledges of which have never been successfully burned in a shaft kiln for this very reason. Another limestone which is difficult to burn in a shaft kiln, but which can be burned in a rotary kiln, is the soft chalky limestone found in central Florida.

Still other examples are the coral sands which form the shores of certain islands in the Pacific Ocean, and shells and shell marl. All these materials are now successfully burned in rotary kilns.

Quality of Product

The quality of the product of any lime kiln will depend primarily on that of the stone burned. Pure lime can only be made from pure limestone, etc. So far as burning goes, the quality of the lime is most affected by the completeness with which the stone is dissociated into calcium oxide and carbon dioxide, or, in common parlance, how much "core" is left in the lime. With the shaft kiln, the lime being in large pieces, the lime can be picked over by hand and any unburned lumps discarded. In the case of some shaft kilns, notably the large gas-fired kilns, the amount of core so obtained often becomes considerable. It is certain that the "run-of-kiln" lime from the rotary kiln is fully as well burned as the "run-of-kiln" from the shaft kiln, but owing to the condition of the rotary kiln product no sorting is possible, while in the shaft kiln the best material can be selected and sold to the builders while the culls are sold for agricultural and other less exacting uses. Naturally, this selected lime should be better than the run-of-kiln material, particularly where the kiln is not skillfully handled.

In the past there has been considerable objection to the product of the rotary kiln, especially in the building trade. This prejudice was due largely to ignorance on the part of the builder. Fine lime was usually the result of air-slaking, and as air-slaked lime has partly reverted to the carbonate it was natural that the builder should demand lime in lumps. As the product of the rotary kiln ranged in size from 2 in. to dust, on being supplied with the finer product of the rotary kiln the builder supposed he was obtaining air-slaked lime or, at any rate, fine and hence inferior lime. The product of the rotary kiln was always accepted as satisfactory for chemical and metallurgical purposes, the finer condition being an advantage. Here the user often burned his own lime and sometimes, as in the case of carbide, conveyed it hot from the kiln to the

*Paper read at Lime Symposium, American Chemical Society, Richmond, Va., 1927; *Industrial and Engineering Chemistry*, May, 1927.

electric furnace. There have for years been numerous rotary kilns burning lime in sugar, paper-pulp, ammonia, carbide, and metallurgical works, and until recently much of the lime burned by lime manufacturers themselves in rotary kilns was sold to chemical and metallurgical industries.

Gradually the prejudice of the building trade against rotary-kiln lime has been overcome, and much of it now finds its way into this industry. "Granular-lime," "pebble-lime," and other popular brands are products of the rotary kiln. Experience has taught certain manufacturers how to burn lime in the rotary kiln so that it will meet the requirements of the building trade. Screening the lime into several sizes, designed to meet the special requirements of definite users, has also helped to make the rotary-kiln product acceptable.

The introduction of pulverized lime in the building trade has made possible the sale of rotary-kiln lime for mortar purposes on a scale not heretofore deemed possible. It has been found that plaster made from lime ground to such fineness that all of it will pass the standard 30-mesh screen will not pit even when the mortar is allowed to soak for only a few hours. The popularity of fine lime is therefore due to the shorter time between slaking and using—an important thing in cities where space for mortar boxes is limited and quick handling is desirable.

Since the smaller lime pieces can be pulverized more easily the rotary-kiln product offers a better starting point for pulverized lime than the larger product of the shaft kiln. It has also been found of no disadvantage, and possibly of advantage, to have a small percentage of unburned material in pulverized lime; hence there is no objection to a small amount of core such as is sometimes left in rotary-kiln lime if it is too lightly burned.

Lime can be burned much more completely in a rotary kiln than in a shaft kiln. Where necessity demands a fully burned material, with only a few tenths per cent of carbon dioxide remaining, it is almost an impossibility to burn to this extent in a shaft kiln but relatively easy to burn down to 0.25% carbon dioxide in run-of-kiln product in the rotary kiln. This is, of course, of interest only to metallurgical and electro-furnace users.

Formerly considered only as useful in burning lime for agricultural and metallurgical use, much of the product of the rotary kiln is now meeting all the requirements of the most exacting users, in some instances even being given preference over the shaft-kiln product.

Economic Production—Quarrying the Stone

The quarrying of stone for the rotary kiln is more economical than for a shaft kiln, owing to the requirement that the stone for the shaft kiln shall all be broken to pieces not larger than from 8 to 10 in. or smaller than 3 or 4 in.

The necessity of having the stone of this size increases very materially, not only the labor, but also the waste in the quarry. Where the small stone, or spalls, can be sent to a cement plant or other use can be found for them, the item of waste is not great, but where they must be thrown away the loss from this source is considerable. Where a rotary kiln is employed the saving of labor in the quarry is very noticeable. The sledging of the stone to proper size for the shaft kiln and the necessity for hand-sorting and forking add much to the cost of quarrying.

The crushing of the stone to 2-in. size does not represent anything like the operation that hand-sledging does. Furthermore, if the tonnage handled is large enough to justify its use economically and the stone does not have to be sorted in order to throw out impure material, a steam shovel may be employed for loading. Of course, large crushers followed by screens may be used to crush and size stone for shaft kilns, but in order to justify this the operations must be large, certainly over 500 tons daily, whereas with the rotary kiln the crushing unit can be made to match the output desired.

The power required to crush the limestone may be safely figured at about 1¼ hp. hours per ton of limestone crushed, which is equivalent to 2½ hp. hours per ton of lime produced (1.87 kw. hours). Whether power is purchased or generated, this expense would prove small in comparison with hand-sledging.

When limestone is purchased it can generally be obtained crushed and screened to definite size cheaper than sledged to shaft-kiln feed, and where it is received at the lime plant by rail crushed stone is the more easily handled.

Actual comparative figures of costs are hard to obtain, because few quarries are operated under similar conditions and where shaft and rotary kilns are employed side by side one is usually burning hand-picked stone and the other spalls, etc. Figures are obtainable at numerous quarries, however, where the same rock is sent to both crushers and shaft kilns. Here it is generally customary to pay more for stone sent to the lime kilns than for that sent to the crusher—at some plants as much as 50% more. For example, at one quarry furnishing furnace-flux and also burning lime, where occasional lenses of bad stone must be discarded for both purposes, the loaders are paid 37.5 cents per ton for kiln stone and 25 cents per ton for rock sent to the crusher, etc.

It must be remembered, however, that the rotary kiln will not make good lime out of spalls where clay and overburden are mixed with them. Where the stone must be forked to free it from these impurities, the cost of loading shaft-kiln stone and and rotary-kiln stone approaches more nearly the same figure, because the waste rock is about the same in both instances.

Labor of Operation

The labor required to operate the grate-fired shaft kiln is considerable. In addition to the firing, a large amount of labor is required in drawing, particularly where the lime sticks. On an average, one man is needed to fire and tend each shaft kiln. The ordinary shaft kiln of this type produces from 8 to 25 tons of lime per 24 hours. A 6 by 125-ft. rotary kiln will produce 50 tons of lime per day. Rotary kilns are now in operation which burn 175 tons of lime per day, and it is probable that one of the large rotaries such as are used in the new wet-process cement plants (11 × 200 ft.) would burn 350 to 400 tons. One attendant can easily look after one of the latter kilns or two or three of the former if the plant is properly arranged. The same man usually operates both the gas producer and the kiln. Naturally, if oil is used less labor is required than with coal.

The labor required to crush and handle the stone and see that it is being fed into the kiln properly is no more than that necessary to charge the ordinary shaft kiln.

At a well-equipped plant comprising six shaft kilns producing about 100 tons of lime per day the labor required is as follows:

2 men charging the kiln. 1 shift (10 hours).
6 men burning, 2 shifts (12 hours).
1 man handling coal and ashes, 1 shift (10 hours).
2 men drawing, 2 shifts (10 hours).

19 men—Total.

This, of course, does not include the labor of packing and loading the lime. At this plant the labor of burning, including charging and drawing the kiln, amounts to 2.2 man-hours per ton of lime produced. This plant is equipped with a pan conveyor for handling the lime and an elevator and bin for handling coal.

At a rotary-kiln plant with a capacity of nearly 150 tons per day in the same section of the country, the labor required is as follows:

2 men at crusher and placing stone in the bin, 1 shift (8 hours).
1 man burning, 2 shifts (12 hours).
1 man oiling and tending stone-bin, 2 shifts (12 hours).
1 man handling coal and ashes, 1 shift (10 hours).

7 men—Total.

At this plant the labor for burning, including crushing, amounted to 0.6 man-hour per ton.

When the rotary-kiln plant is smaller, the difference in labor cost becomes less noticeable. It follows, therefore, that the rotary kiln is chiefly adapted to fairly large tonnages and that for small outputs, 50 tons or less, the shaft-kiln plant if well designed employs but little more labor than the rotary-kiln plant.

Fuel Economy

Pulverized coal, producer gas, and oil are all now successfully used for heating the rotary kiln. Pulverized coal is probably the most economical fuel and is also easy to handle. Oil is the most convenient fuel, but it is more expensive than coal in most localities. It is the cheapest installation to make.

Producer gas is the most expensive system to install and it is also the most troublesome to apply. The producer itself is difficult to operate so as to give a uniform supply of gas both as regards quantity and quality. Producer gas is not so economical as pulverized coal and more fuel is required when the coal is gasified and burned than when it is used in the pulverized condition. Unfortunately, where pulverized coal is employed some of the ash enters the lime and reduces its purity. Actual tests show that with a coal containing 11% ash the amount entering the lime is sufficient to increase the impurities in a certain lime from 2.9% to 3.6% and to decrease the calcium oxide from 95.0 to 94.3%.

In spite of the fact that the use of pulverized coal to burn lime is much more economical than that of oil and producer gas, the majority of lime manufacturers who are employing rotary kilns will not now consider using powdered coal because the ash enters the lime and, having introduced their product into the most exacting classes of trade, they will not consider any economies which might detract from its high quality.

Oil and producer gas are both used extensively for heating shaft kilns. Pulverized coal has never been successfully employed with this type of kiln—possibly because this fuel has never been tried by those who understand it or were willing to make the necessary changes in their shaft kilns to meet its requirements. The question of the contamination of the lime by the fuel ash applies here also. By far the greater majority of shaft kilns are heated by means of coal burned on either hand-stoked or mechanical grates. Theoretically, gas-firing of shaft kilns seems to offer many advantages over hand-firing of coal on grates. In practice, the gas-fired kilns, while unquestionably showing better economy of fuel, have developed other troubles which make it doubtful in the minds of most lime manufacturers and engineers if the producer-fired kiln, when considered from all angles, is any improvement over the better types of hand-fired kiln. In this paper, therefore, rotary kilns are compared with shaft kilns fired by hand.

The fuel requirements of shaft kilns vary largely. Undoubtedly, expert handling and good firemen have much to do with the results. The grate surface allowed, draft, and other matters influencing the combustion of coal also affect economy to a considerable degree. As with the rotary kilns, the relative height above the arches and the internal diameter of the kiln, other things being equal, affect the fuel economy of the shaft kiln more than anything else. Tall, narrow kilns operated with induced draft require less fuel per ton of lime than do the lower kilns of relatively large diameter operated by natural draft. Similarly, of two rotary kilns of the same internal diameter but of different lengths, the longer will take less fuel. The fuel requirements of both rotary and shaft kilns, therefore, vary largely among themselves.

A shaft kiln heated by a good grade of run-of-mine gas or slack coal will burn from 2.5 to 4 lb. of lime per lb. of coal—that is, it will have a fuel-lime ratio of from 1:2.5 to 1:4. A rotary kiln heated by producer gas will have a fuel-lime ratio of from 1:2.5 to 1:3.5. If the kiln is heated by pulverized coal the fuel-lime will be 20 to 30% higher.

In the matter of fuel economy the writer is inclined to give the well-designed shaft kiln the preference over the rotary kiln. For burning the better grades of building lime and employing producer gas, the rotary kiln will require an average of from 10 to 20% more fuel than the shaft kiln. For burning chemical and metallurgical lime the requirements are more nearly equal. Where pulverized coal or oil can be used the fuel-lime ratio is about the same for the two kilns.

In comparing the fuel requirements of the two outfits, however, we must remember the possibility of recovering much of the heat lost in the rotary kiln, which is impractical with present equipment in the case of the shaft kiln. It is now common practice in the cement industry to operate the entire plant by the steam generated from the gases of the kiln by employing waste-heat boilers.

The waste gases leave the kiln at about 1200-1400-deg. F., and hence contain a large part of the heat liberated by the burning of the fuel. This heat can be successfully utilized in boilers, as has been done to a small extent in the lime industry. In the cement industry, by cutting down air leakage and the use of economizers following the boilers, an efficiency of 75% has been obtained. The weight of gases usually amounts to between 8500 and 10,000 lb. per ton of lime produced. The heat in these gases will therefore be approximately 2,800,000 B.t.u. This is about one-third of the total energy of the coal burned, the other two-thirds being utilized in the decomposition of the limestone or lost in radiation from kiln and cooler shells. Of the heat in the flue gases, as much as 75% has been successfully utilized by waste-heat boilers in the cement industry. This would amount to 2,100,000 B.t.u. per ton of lime produced, which is equivalent to 1925 lb. of steam at a pressure of 200 lb. per square in. and 100-deg. F. superheat, or 62.7 boiler hp. In a modern turbo-generator set, the requirements are about 17.5 lb. of steam per kw. hour at the switchboard. If so used, therefore, the above quantity of steam would produce 110 kw. hours. A kiln burning 4 tons of lime per hour, therefore, would be good for about 440 kw. hours. Most lime plants are operated in connection with crushing plants, mills for grinding lime, pulverizing limestone, or hydrating lime, so that this power can generally be utilized. The kiln, crusher, and accessories will not require more than one-fifth of this, leaving about 350-hp. for outside uses.

In the cement industry the results are even better than this. At many plants from 3 to 4 lb of steam are generated per lb. of coal burned in the kiln and the conditions are not so different in the two industries.

It is only fair to say, however, that the installation of a modern water-tube boiler, economizer, superheater, turbo-generator, condenser, etc., to produce this amount of power would represent a considerable investment, possibly a greater investment than the kiln itself, and against this power must hence be charged a considerable interest and depreciation item. Where lime manufacturers generate their own power, however, the matter of rotary kilns and waste-heat boilers should receive careful consideration.

Repairs

Repairs to both the shaft and rotary kilns are confined largely to the renewal of the fire brick in the hottest part of the kiln. In the shaft kiln the arches and the fire brick adjacent to them are subject to frequent renewals, while in the rotary kiln about 15 or 20 ft. of the lining has to be renewed. In both shaft or rotary kilns it is usually necessary to make repairs after from 6 to 9 months' service. The repairs in the case of the rotary kiln are made much more easily than in the case of the shaft kiln. Since the shaft kilns seldom have a larger capacity than from 15 to 25 tons of lime per day each and since the rotary kilns are usually employed only for 50 tons or more, the greater number of furnaces to be repaired in the case of the shaft kilns puts them at a disadvantage. Furthermore, the emptying and recharging of the shaft kiln are operations of considerable magnitude. Cooling, drawing down, charging, heating up, etc., all take time and much labor. With the rotary kiln it is only necessary to allow the kiln to cool, clear out a few tons of crushed material, take out the damaged lining, and replace. Usually the operation of the kiln is only interrupted for 3 or 4 days and within 2 or 3 hours after applying the heat the kiln is turning out practically its full output of good lime. Occasionally repairs have to be made to the mechanical parts of the kiln. A roller has been known to break and after several years' use some of the gears in the drive have to be renewed. If a gas producer is employed, the repairs on this are much heavier than on the kiln itself.

Actual comparative figures on the cost of repairs mean little because they depend largely on the care with which both kilns are operated. A rotary-kiln lining should last at least six months. At the end of this time, about 20 ft. of this lining may need renewal. The cost of this work in the case of a 6 × 125 ft. rotary will amount to about $350 for brick and labor. After 6 months this kiln will have burned, if operated at capacity, about 9000 tons of lime, so that the repairs to the lining will amount to about 4 cents per ton of lime produced. This represents very good operation, however, and lining repairs usually cost from 6 to 10 cents per ton of lime.

The writer's own experience has been that repairs to the shaft kiln are seldom as low

as this and are generally at least twice this much. If, however, the repairs to the gas producer, where this is used to heat the rotary kiln, are also considered and added to the cost of kiln maintenance, as they should be, the repairs on the two types of kiln—grate-fired shaft and producer-fired rotary—are more nearly equal.

Cost of Installation

The cost of rotary-kiln lime plant, including the crusher, kiln, cooler, motors, and building, but exclusive of arrangements for packing and loading, will amount to from $1250 to $2000 per ton of lime capacity depending on fuel employed, etc. The cost of a modern grate-fired shaft-kiln plant, inclusive of incline and hoist but exclusive of packing building, etc., will range from $1000 to $1500 per ton of lime capacity for first-class equipment. A waste-heat boiler plant, if desired, will probably add from 50 to 75% to the cost of a rotary-kiln lime plant, depending on the equipment selected.

It will be seen that the first cost of a rotary-kiln plant is from 25 to 35% greater than that of a grate-fired shaft kiln of similar capacity.

Miscellaneous

Where induced or forced draft is not included in the shaft-kiln operation, the power required to operate is confined to that necessary to hoist stone to the top of the kiln. This is, of course, practically negligible—say, 0.25 kw. hour per ton of lime burned.

The power required to operate the kiln per ton of lime produced is about as follows:

	Kilowatt-hours
To revolve kiln, feeder, etc.	3.2
To revolve cooler	2.0
To elevate stone, operate producer, etc.	1.0
Total	6.2

Where pulverized coal is employed to heat the kiln, about 6 kw. hours are needed.

The dust loss from the rotary kiln is appreciable. It probably amounts to from 1 to 3% of the limestone fed into the kiln, depending on the character of the stone, etc. If this is likely to be a nuisance in the community, as where the lime plant is located near a town, it may be necessary to collect this dust by means of a Cottrell precipitator, washer, or some other device such as is used in the cement industry and at one or two lime plants.

Conclusions

The rotary kiln is best suited to burning lime: (1) where run-of-kiln lime will meet the requirements of the market; (2) where quarry spalls, highly crystalline, and very soft limestones, shells, marl, etc., are to be burned; (3) for large outputs; (4) where operation is continuous; (5) where labor is high; (6) where fuel is cheap, where oil is obtainable as a fuel, or where pulverized coal can be used; and (7) where waste-heat boilers can be installed and the surplus power so obtained employed to advantage in other operations.

The shaft kiln is preferable: (1) where it is advisable to select the lime in order to secure a product that will meet the most desirable trade; (2) where the limestone is hard and compact; (3) for small operations; (4) where low first cost is desirable; (5) where the demand for lime is likely to be variable; (6) where labor is cheap and fuel high; (7) where power is not obtainable; and (8) where dust is liable to cause a nuisance.

Introducing Agricultural Limestone in British Columbia

By E. R. BEWELL

Manager Secretary, Comox Limestone and Fertilizer Co., Ltd., Courtney, B. C.

OWING to the heavy rainfall on the coast here in British Columbia, we have an acid soil from the continuous leaching of heavy rains for several centuries. This leaching has reduced the lime content in the soil to a very low percentage, and greatly hinders the production of profitable crops. Legumes are hard to grow on account of the shortage of lime in the soil. Some of the legumes will not grow at all under present conditions.

It has been felt for some years that limestone was needed, but the price made it prohibitive. The farmers have been looking for a source of cheap limestone for years, but could not get what they wanted. In 1926 a limestone demonstration was held here which proved that limestone was necessary to produce profitable crops.

As the district agriculturist, the writer spent considerable time looking into a source of supply that would be cheap, as this is a big factor in the use of limestone. Several propositions were looked into, but the one which was considered most likely and which was adopted was to form a company of the local farmers and purchase a crusher and do the crushing right in the district.

A building on the Courtenay River was rented and fitted up for the purpose. Electricity was secured at a cheap rate and operations commenced.

But there is no limestone in the district, so it had to be brought in. This was arranged for with the Pacific Lime Co., which has a large quarry on Texada Island at Blubber Bay. This company was doing some crushing of lime rock for agricultural purposes, but not enough to warrant carrying on, so they thought our plan of crushing in the district was best and offered to sell us the lime rock, loaded on scows, at a very reasonable rate. Owing to the unfavorable weather this winter, we have been delayed quite a lot and expenses have been higher than was expected, but limestone has been sold to farmers at $4 per ton in bulk at the plant and at $4.75 on cars. Six carloads were sold and shipped to points on Vancouver Island. The 75-cent charge was to pay for hauling from the plant to railroad. Some 650 tons were brought in in four scow-loads, and over 400 tons will be used in the district this year. This is a big increase over about 40 tons last year, and as soon as the farmers see the results to be obtained, it is fully expected that the amount used yearly will soon reach 1000 or 2000 tons per year and keep the plant going all summer.

It is planned to screen all the crushed rock in future and get the screenings for chicken grits. The lime rock is very high grade, testing 97.25% calcium carbonate.

Our company is incorporated so that we can enter the fertilizer business and may enter this field another year. We may also install equipment to make cement tile here to supply the district, as a great amount of drainage is needed to put the land in good shape to let the limestone and fertilizers do their work.

Proposed Standard Specifications for Lime

COMMITTEE C-7 ON LIME, of the American Society for Testing Materials, held a meeting on March 18 at the Bellevue-Stratford hotel, Philadelphia, to take action upon its various standards and the recommendations which the committee plans to present at the approaching annual meeting concerning them. Four of its tentative specifications covering quicklime and hydrated lime for use in the chemical industry, such as the manufacture of sulphite pulp, the manufacture of varnish, and for use in water treatment, are being recommended for advancement to standard. Other of its tentative specifications are being revised in regard to the chemical requirements specified.

The committee is interested in a paper that has recently come to its attention, constituting an exhaustive study of porosity of building materials and the relation of porosity to weathering properties. This paper should be of general interest, since it applies to a number of masonry materials, such as stone, brick, terra cotta, etc.

The chairman of the committee is H. C. Berry, professor of materials of construction, University of Pennsylvania, Philadelphia, Penn. The secretary is J. S. Elwell, National Lime Association, Washington.

Argentine Appropriation for Roads Makes Record

THE transportation division, Department of Commerce, in a statement April 20, points out that a record estimate for road development in Argentina is included in the budget of that country for 1927.

Following is the full text of the statement:

The increasing interest in the development of roads which is being displayed in Argentina is reflected in the appropriation of 20,000,000 paper pesos (approximately $8,400,000) for roadways contained in the budget of that country for 1927. This is a record appropriation for such work and indicates a steady increase since 1918, when 1,467,000 paper pesos were set aside for this purpose.

Gradation of Machine-Broken Stone

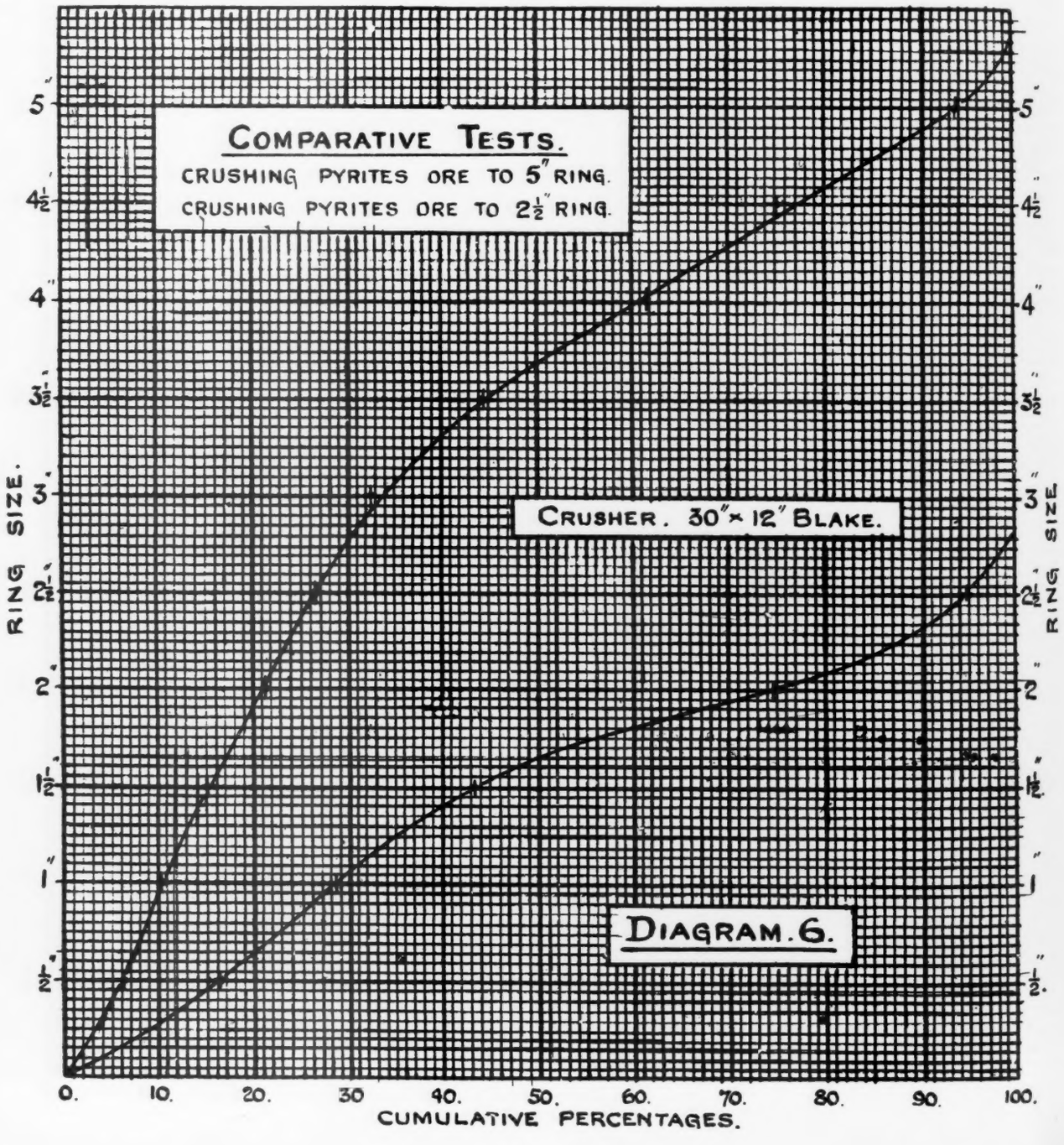
Part III. Effect of Variation in Feed Size—Single Stage vs. Double Stage Crushing—Crushing in Closed Circuit

By Wm. T. W. Miller

THE statement is frequently made that the gradation diagram for machine-broken ore or stone may be taken as following a straight line between the maximum ring size and the zero point in the screen scale. That this is not true in every case is proved by Diagram 6 which is a record of two tests made with a 30x12 in. Blake crusher breaking a heavy copper pyrites ore from the Rio Tinto district in Spain.

In the coarse crushing test 93.5% passed a 5-in. ring and, if the straight line theory held good, half of this, or 47% of the product should have been minus a 2½-in. ring. The actual percentage of the middle size material was 27%.

In the fine crushing test 94% passed a 2½-in. ring of which 47% should in this case have been under 1¼-in. ring to give a straight line diagram. Actually the minus 1¼-in. ring material was nearer 35% of the



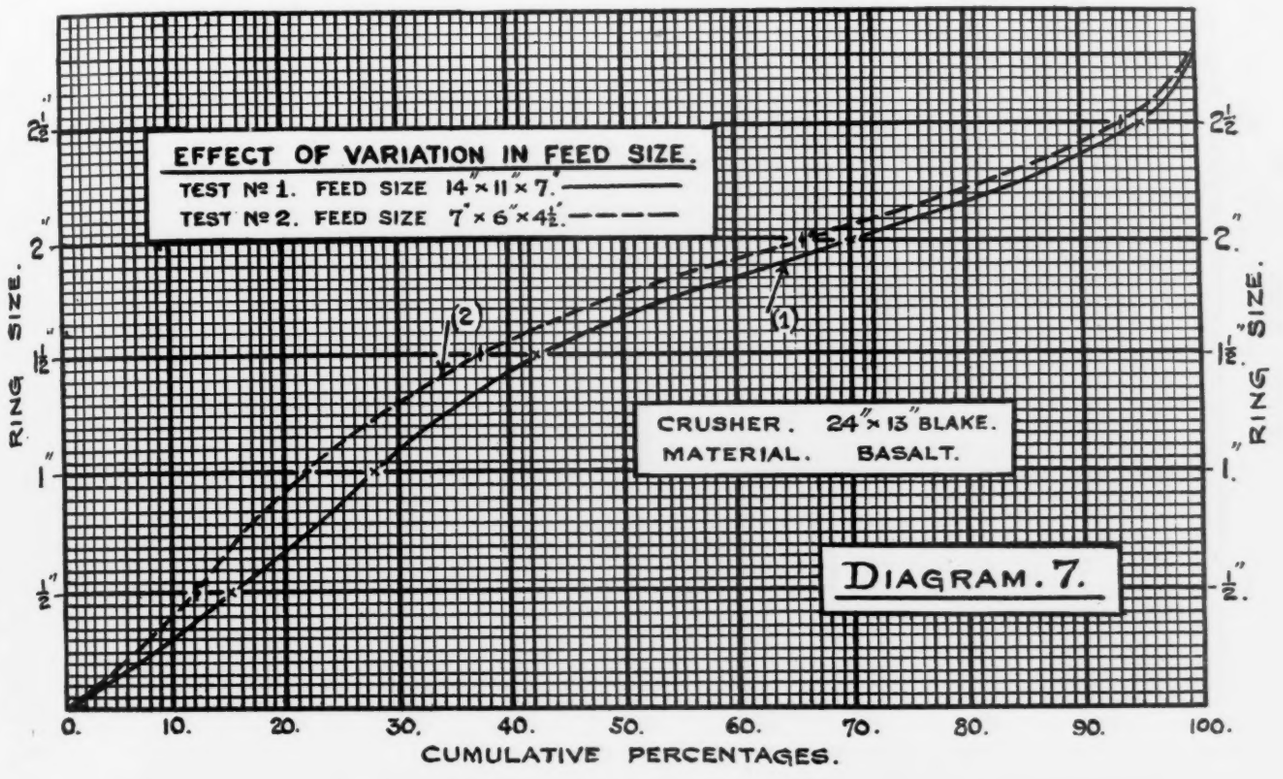
whole, as shown also in Diagram 6.

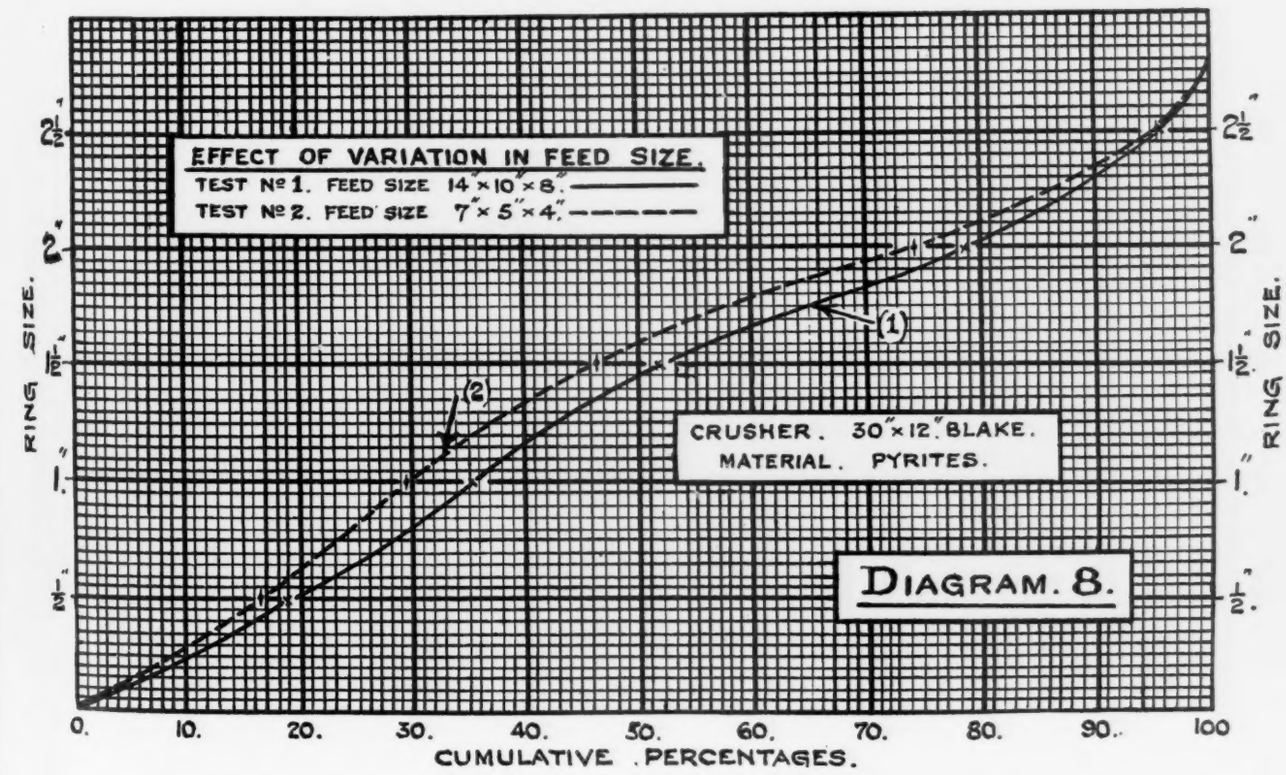
In these tests the average size of the lumps of ore which were fed to the machine was kept as near as possible uniform, so that the work done on the material varied considerably. The greater departure from the straight line in the coarse crushing test proves that the less the ratio of reduction, or the smaller the amount of work done in the crushing process, the smaller the proportion of the finer sizes in the product, which is in every sense logical.

When any crushing machine is fed with pieces which are all close to one uniform size and particularly where the lumps are small in size relative to the dimensions of the feed opening, there is some tendency for the work to be concentrated in a zone of restricted area which causes packing and "choke" crushing and counteracts any advantage due to the small ratio of reduction.

In order to illustrate more closely the effect of the extent of reduction on the gradation curve four jaw crusher tests are given in Diagrams 7 and 8, which show that the greater the work done on the material the higher the percentage of fines.

In each case two trial runs were made on a similar material, in one instance a basaltic whinstone, and in the other a heavy pyrites



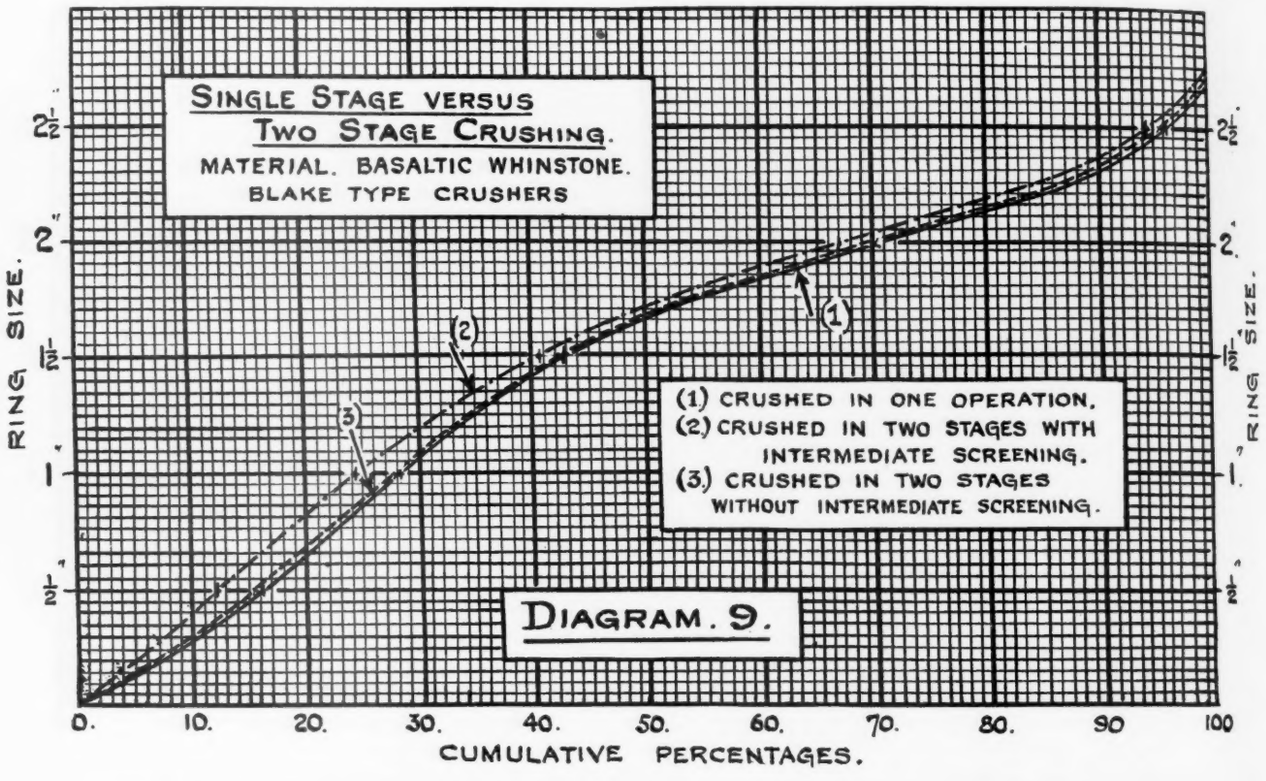


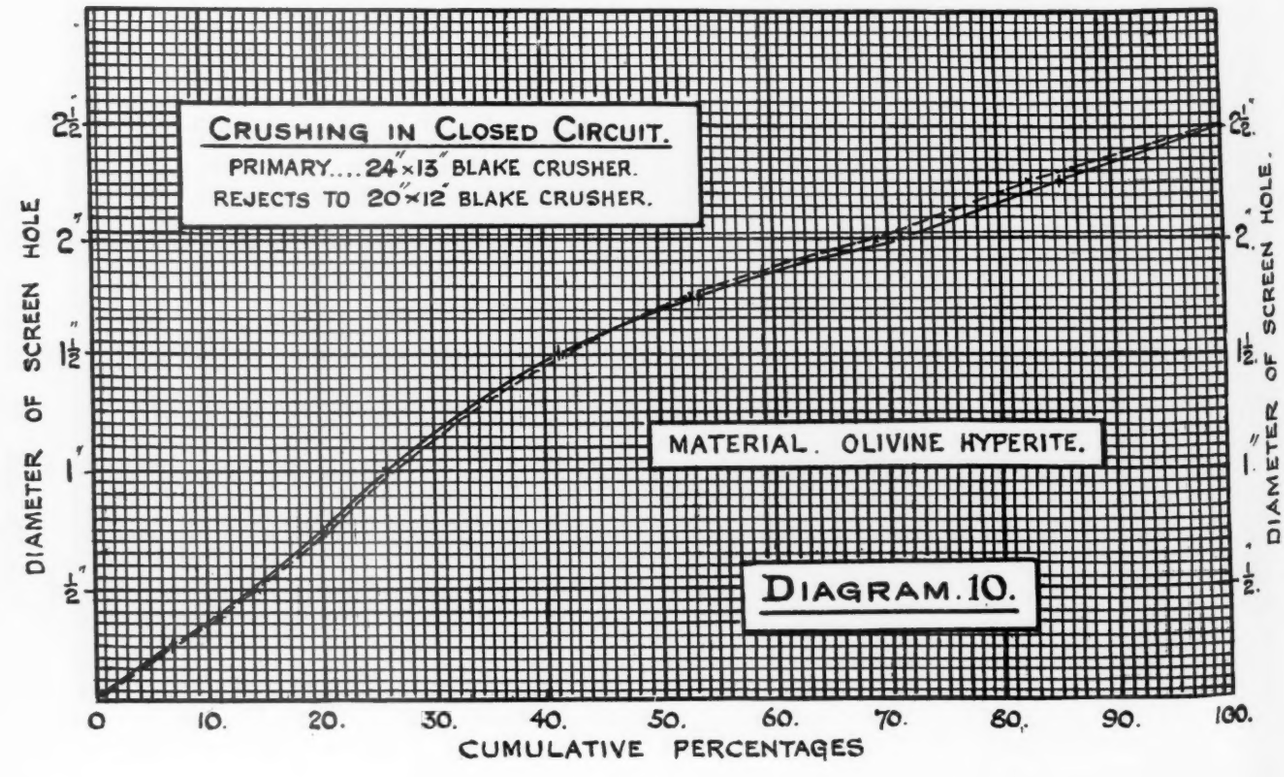
ore. The feed consisted of selected lumps all of similar dimensions and averaging in the second tests about half the size of those used for the earlier record, which means that the cubical contents varied in the ratio of seven or eight to one. No change was made in the setting of the jaws so that each pair of tests was strictly comparable.

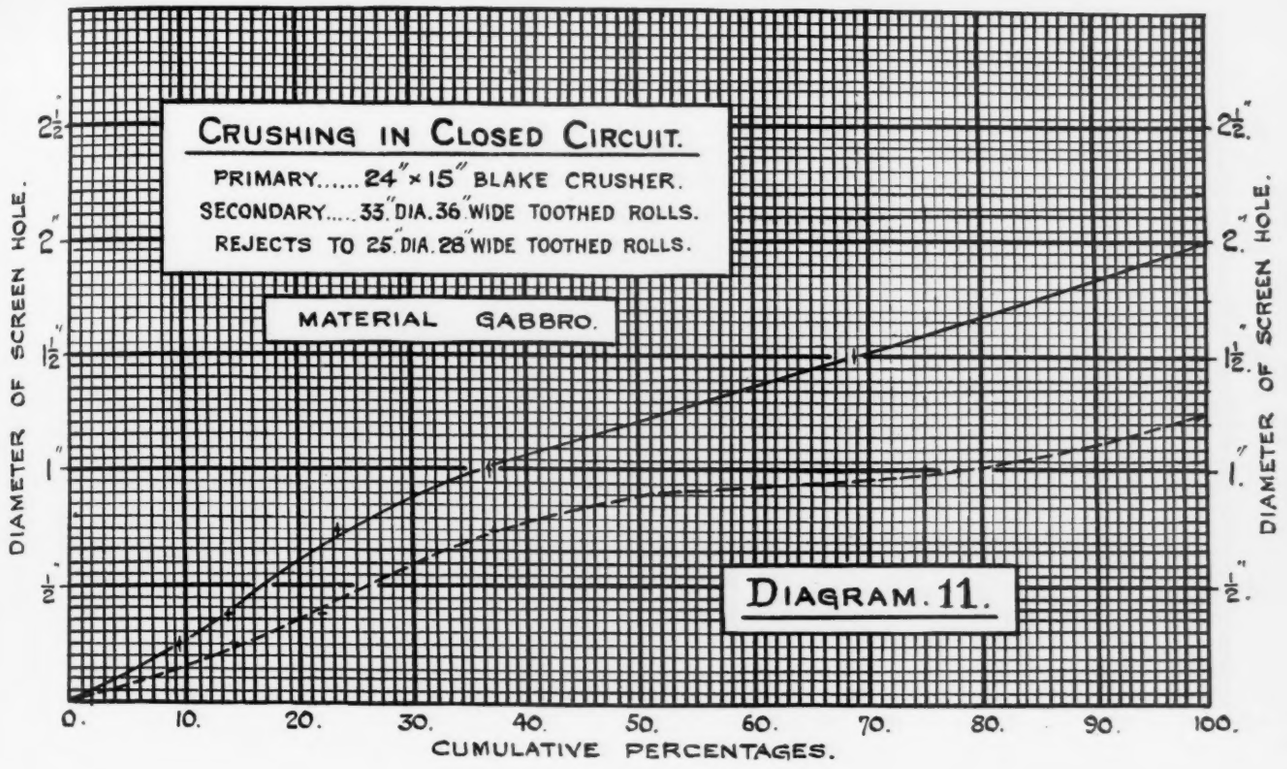
Although the change in the curve is clear and distinct, it is hardly so great as might be thought possible. It should also be noted that in most cases the quarry run of stone or ore will include both large and small pieces so that in this respect is is hardly fair to judge the record of a sizing test without having some knowledge of the composition of the feed.

Where the material as delivered to the plant contains a high proportion of the smaller sizes these are usually extracted before reaching the crusher, and when it is desired to build up a gradation diagram for the complete installation, the composition of these fines must be carefully taken into account.

It is generally advisable, at each step in the reduction process, to remove any sizable material before subjecting the remainder to a further crushing operation, as, not only does this increase the tonnage capacity of the







plant, but it makes for cleaner crushing with less power consumption.

It is sometimes claimed that this intermediate screening reduces the amount of fines made during the crushing but, although this is undoubtedly true, the writer has never been able to find any very great change in the gradation curves.

Diagram 9 records three tests which may serve to illustrate this point. In Test No. 1 the stone was broken in a single stage in a 24x13-in. jaw crusher. For Test No. 2 the sledger was a 30x12-in. Blake machine and the coarse product was discharged direct to a 24x13-inch secondary breaker after passing a screen with 2½ in. diameter holes. The figures for this test show the cumulative percentages including the material passing the screen along with the product from the secondary breaker. In the third test the stone was crushed in two stages, in the machines used for Test No. 2, but without intermediate screening.

Operating the plant in a closed circuit, with a secondary breaker to take the rejects, is much the same as two-stage crushing with intermediate screening except that there is no oversize and some of the feed will have passed through the secondary machine several times before being broken to pass the screen hole.

Diagram 10 gives two careful records of screen sizes taken from a jaw crusher plant in Norway crushing what is known locally as "black granite."

The sharp bend at the top of the diagram is missing in this instance, which changes the characteristic curve to some extent, but the general contour varies very little from Diagram 9, or any other typical graph for a jaw crusher product passing a 2½-in. ring.

The tests recorded in Diagram 4 and 5 proved that although the type of crushing machine has some influence on the gradation of the product, this effect is not so great as is sometimes imagined.

An exception to this ruling should be made in the case of slow-moving cubing rolls with toothed shells. So long as teeth are in good condition these machines give a regular and cubical product with a very low percentage of fines.

Diagram 11 is a record of the screen tests made during two trial runs on a macadam rock plant in the Channel Islands, crushing in three stages with intermediate screening, the secondary and tertiary crushers being cubing rolls.

The sizes given represent screen perforations, and in the second test the screen plates were changed so that the circuit was closed by 1¼-in. diameter holes as a maximum.

The influence of the cubing rolls is more noticeable in the fine crushing test.

The German Limestone Industry in 1924

Trade Commissioner W. T. Daugherty, Berlin

SALES of German limestone are reported to have been about 20% higher in 1924 than in 1923—attributable to the approximate 70% increase in its consumption by the German iron and steel industry. After the abandonment of passive resistance, in October, 1923, the blast furnaces gradually regained some of their production. That their 1924 activity was well below 50% of normal, however, may be gaged from the fact that their 1923 consumption of limestone was only about 25% of normal. The building trades, generally heavy consumers of limestone, on the other hand, were not able to increase their consumption.

Less Limestone Used by Chemical Industry—Fertilizer

While the calcium cyanamide plants (the chief producers being the Piesteritz, Central German and Trostberg, Bavarian works) increased their consumption of quicklime by about 22%, other chemical enterprises consumed German limestone but sparingly. The German chemical industry generally was adversely affected by the economic dislocation in the occupied area, and by foreign competition, much of it American, which has wrested from it a good part of its former export markets.

German agriculture took about 50% more limestone in 1924 than in 1923. The soil, it is said, still requires limestone fertilizer, to neutralize the free acid left in it by intensive fertilizing with such sulphate fertilizer salts as superphosphate and ammonium and potassium sulphates.

Operating at About 30% Capacity

The increase in sales of limestone in 1924 is not viewed as particularly encouraging. The limestone works, on the average, were operating at only about 30% capacity, and, indeed, in some south German plants, there were periods when they were on only a 10% basis. Capital shortage is repeatedly given as the cause of the inability of consuming industries to purchase in greater volume. The recent removal of the export "prohibition" against German limestone, however, of its pre-war markets for this material."—may permit the country to recapture some *U. S. Commerce Report.*

Some Points in Connection with Depreciation*

With Particular Reference to the Portland Cement Industry

By O. N. Lindahl
Auditor, Universal Portland Cement Co., Chicago, Ill.

A SAD commentary on the so-called "business efficiency" of our American business man is revealed in a study of the 1925 corporation income tax returns published in the newspapers a few days ago.

Of 414,461 corporations which filed returns for the year 1925 more than 40% of the total not only reported no net income but a total deficit of $1,739,107,755.

In other words, the 169,917 corporations which reported no net income incurred an average loss of more than $10,000 each.

Are these losses due to ignorance of business principles, or are they due to incompetence?

Waste and mismanagement should have no place in American business life.

Yet 40% of American business corporations testify under oath that not only did they not make any money in 1925, but, on the contrary, incurred net losses which add up to the grand total of $1,739,107,755.

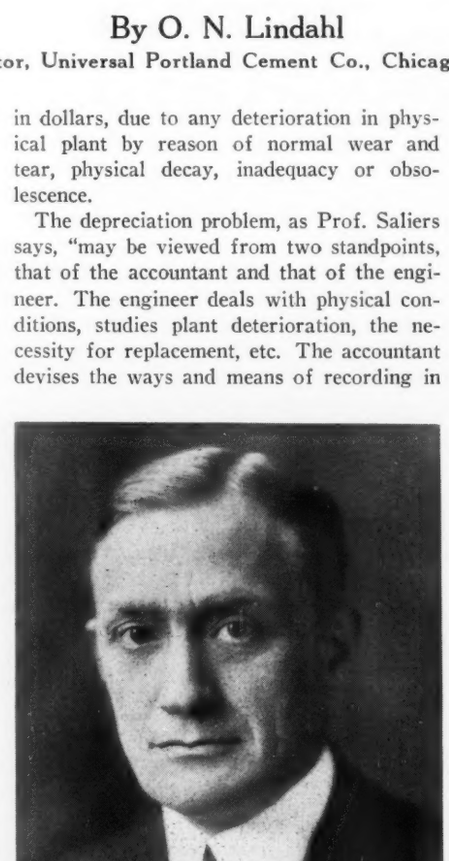
Many Corporations Do Not Know Costs

What is the reason for this? One reason for it is that corporations do not know their costs, or they would not sell at prices that would leave them without a profit. Probably the one element of cost most neglected is in the failure to make proper charges for depreciation in the cost of their products. The tendency is in good times to charge against profits the full amount of depreciation, but when times are not so good the depreciation charge is the first item that is pared down. This is a serious mistake. Assets depreciate and should be depreciated in accordance with the facts, regardless of business conditions.

Depreciation from an academic standpoint resolves itself in a question mark upon which theorists and practicalists do not seem to agree.

Depreciation as defined in Webster's Dictionary is "A wasting away or falling in value," while the accountant, as a matter of course, considers depreciation as a wasting away of so much of the business asset each year over a period of years until that asset has finally through wear, tear or obsolescence become worthless. Another definition equally as good if not better is that depreciation is a reduction in utility value, expressed as a percentage, but more usually in dollars, due to any deterioration in physical plant by reason of normal wear and tear, physical decay, inadequacy or obsolescence.

The depreciation problem, as Prof. Saliers says, "may be viewed from two standpoints, that of the accountant and that of the engineer. The engineer deals with physical conditions, studies plant deterioration, the necessity for replacement, etc. The accountant devises the ways and means of recording in the most intelligent manner the facts in connection with the changes."



O. N. Lindahl

Causes of Depreciation

Causes of depreciation to tangible properties are wear and tear, or physical factors; inadequacy and obsolescence, accidents or contingent causes.

Wear and tear from operation is largely dependent on the policy as to current repairs and maintenance; however, sooner or later, every machine, due to friction of parts, strains under normal and abnormal loads, and other causes, becomes unfit for further service. Wear and tear from age, known as decrepitude, is due to the forces of time and the elements, and this ravage applies to conduits, telephone and telegraph poles, buildings, etc.

Inadequacy of machinery to meet requirements, due to change of policy, motives of economy or unforeseen development, is a factor of depreciation. Where there is a growing community or a growing appreciation of a commodity manufactured, demand may increase beyond original expectations and the plant equipment will have to be replaced by larger units to take advantage of the expanding market.

Obsolescence is a frequent and important cause of depreciation. Units of machinery and equipment, though in normal operating condition, are at times dismantled and replaced with improved types. Manufacturers realize that in many instances obsolescence causes retirement of machinery long before its physical life is ended. In such cases, in order to maintain or reduce operating costs and to maintain or reduce prices to the market, the discarding of old units is a necessity.

Real Purpose of a Depreciation Charge

Before taking up a general discussion of depreciation it is well to take into consideration the real purpose for making a charge in our costs for depreciation. The real purpose, as I see it, for taking up depreciation is, first, all expenditure for equipment, materials or supplies, regardless of kind, is finally a cost of producing commodities during the so-called economic life of equipment producing these commodities. All materials and supplies in the process of manufacturing such commodities naturally and correctly are charged into the cost of operation, and, second, in the case of long-life equipment, lasting for many years, the total cost of such equipment cannot be charged against the product in any particular year, and therefore must be apportioned over the estimated life of that particular asset and the cost of that asset spread over the years of its operating life.

We should take up enough depreciation over the period of years which it is estimated any unit of our business will live, so that at the end of the life of that particular unit we shall have in a reserve less residual value the original cost price of that unit. That, in my opinion, is the correct handling of depreciation.

In an old income tax primer I came across

*Paper read before the Illinois Manufacturers' Association at Chicago on April 26, 1927.

the following, which I think fully explains how an asset should be depreciated. It reads, "While each taxpayer must determine the probable lifetime of his property, it has been estimated that the average usable lifetime of a frame building is so much, etc." The point I am trying to bring out here is "the usable life," or, as stated before, the economic life; not the exact life of any given unit, but the usable life of that unit; that is, the life that should be depreciated.

Regulation 69 covers quite fully the handling of depreciation in the accounts, therefore I shall quote parts of Articles 161, 165 and 169 as they are particularly apropos to the subject:

Article 161. A reasonable allowance for the exhaustion, wear and tear, and obsolescence of property used in the trade or business may be deducted from gross income. For convenience such an allowance will usually be referred to as depreciation, excluding from the term any idea of a mere reduction in market value not resulting from exhaustion, wear and tear, or obsolescence. The proper allowance for such depreciation of any property used in the trade or business is that amount which should be set aside for the taxable year in accordance with a reasonably consistent plan (not necessarily at a uniform rate) whereby the aggregate of the amounts so set aside, plus the salvage value, will, at the end of the useful life of the property in the business, equal the basis of the property determined in accordance with Section 204 and Articles 1591-1603. Due regard must also be given to expenditures for current upkeep.

Article 165. Method of computing depreciation allowance. The capacity sum to be replaced should be charged off over the useful life of the property, either in equal annual installments or in accordance with any other recognized trade practice such as an apportionment of the capital sum over units of production. Whatever plan or method of apportionment is adopted must be reasonable and must have due regard to operating conditions during the taxable period. While the burden of proof must rest with the taxpayer to sustain the deduction taken by him, such deductions must not be disallowed unless shown by clear and convincing evidence to be unreasonable.

Article 169. Charging off depreciation. A depreciation allowance, in order to constitute an allowable deduction from gross income, must be charged off. The particular manner in which it shall be charged off is not material, except that the amount measuring a reasonable allowance for depreciation must be either deducted directly from the book value of the assets or preferably credited to a depreciation reserve account, which must be reflected in the annual balance sheet. The allowances should be computed and charged off with express reference to specific items, units, or groups of property, each item or unit being considered separately or specifically included in a group with others to which the same factors apply. The taxpayer should keep such records as to each item or unit of depreciable property as will permit the ready verification of the factors used in computing the allowance for each year for each item, unit or group.

Original Cost Seldom the Same as Real Value

It is important to remember that original cost is seldom if ever the same thing as real value; that property value is seldom if ever the same thing as the amount of the investment, and that the investment or original cost is rarely the same thing as today's reproduction cost less salvage and depreciation. Books of account when properly kept show the investment or original cost. An appraisal properly made shows the cost of reproduction less depreciation at the present time. Reproduction value less depreciation and the past cost of a plant can be approximately the same only under the following circumstances:

(a) When the property has been constructed and equipped under permanent market stability.

(b) When the appreciation and depreciation on past investment together with the original investment happen by chance to produce a sum equal to the cost of all reproduction less depreciation.

The thought has often occurred to me, in order that a business may reflect a true worth at a given moment, the plant account should not be handled in the same manner that inventories are handled; that is, at the end of each year, why should not (if prices have fallen) the plant account be written down to reflect such a falling of prices in the same manner that inventories are written down. To me it seems not only logical, but also important to do this, although I don't know of any concern that does it. It may be considered too radical a thought at this time.

Basis for Depreciation Charges

The question has been raised many times, and will continue to be raised many times more, on what basis should an asset be depreciated?—what I mean by that is, on actual cost to the owner or on replacement value. To illustrate, suppose in 1915 an asset was acquired costing $1,000 and that at the present day the replacement cost of that asset is $3,000, on what basis should the depreciation be charged; or, putting the question in another way, is the intention of the depreciation charge to maintain the capital investment or to replace the physical plant? It is, I think, a recognized fact that depreciation should be charged against a product based upon the life of the particular asset turning out that product, and not against the product turned out after the asset has been dismantled and removed.

If true costs are desired, the original cost of equipment less any salvage value is the amount to be depreciated and charged into operating costs during the economic life of the asset used. The fact that the equipment cannot be replaced at the original cost, but as illustrated, at three times its original cost, has nothing whatever to do with the manufacturing cost of the present product, but only with the cost of future products turned out by subsequent equipment, therefore, correct costs can be arrived at only by including as a depreciation charge the loss based on the original cost of the investment.

There is another problem to consider in the matter of depreciation—that is the ultimate bearing on the cost of the product which is turned out. Two plants built in 1913, side by side, same construction, same cost, same capacity, same output and same management, naturally results in the same manufacturing costs. At the present time, owing to higher construction costs, one of those plants is sold for an amount three times its original cost. The new owners, due to enhancement in construction costs since 1913, must triple the depreciation charge in the cost of production, thereby giving it a smaller margin of profit and possibly eliminating it from competition. This suggests carefulness on the part of the purchaser in analyzing all points involved, even to his competitors' costs of production, before such purchase is made.

Book Values and Depreciation

Engineers in all their wisdom tell us that a machine with an economic or usable life of ten years is not worn according to its depreciated value at the end of any particular period during its life, and that if the machine is producing efficiently at the end if any particular period, it is, so long as it operates efficiently, worth the price of a new machine; the accountant, however, must ignore trying to arrive at the actual worth of a machine at any particular time and work with the thought in mind of its usable life rather than its worth at any given moment.

Because of these statements on the part of some engineers, we are told that our accounts are incorrect and not of much value because they do not reflect the actual worth of a concern as a going one. I have read of a noted economist making the statement that depreciation over and above adequate repairs and replacements and renewals is really bookkeeping fiction; even Dicksee in his "Advanced Accounting" makes the statement that there is not necessarily any close connection between the intrinsic value of a thing at any given moment and the depreciated value at which it appears on the books.

If this leads us to the conclusion that we are in error showing values on the balance sheet, why, then, should we take up a depreciation charge? In my opinion the principal reason for the depreciation charge is to distribute equitably over the economic or usable life of the asset the net outlay of capital. This charge may leave an amount on the books of little value so far as the actual value of the property is concerned, but it will at least leave a figure on the books which will reflect the approximate value of that particular asset. From a going concern standpoint, we must realize that the depreciation charge at best is only, on our part, an estimate, based upon our practical experience and study over a long period of service in the corporations which we serve.

Regardless of how smoothly and efficiently the machine operates through proper upkeep, that machine cannot go on indefinitely performing maximum service, but will in time wear out, and therefore be replaced

either in kind or with a new and improved unit.

It should be remembered that a true cost can only be arrived at by charging into costs, depreciation based on the original cost of the equipment, and this does not necessarily mean that prices for the product manufactured must be based on cost figures so obtained.

If such were the case, the purchaser would get the benefit in price by the use of low cost equipment in days of high cost equipment.

The question then arises, should the customer or the seller get the benefit of this advantage? This resolves itself into a question of policy, which is determined by the management. In most instances, if not all, competition takes care of this.

Handling Obsolescence

There is another feature to be considered in connection with the whole depreciation problem, and that is the question of obsolescence, because the depreciation charge itself should include obsolescence; at times, for some reason or other, a unit of a plant is dismantled where the depreciation accrued has not reached the full original cost of the unit dismantled, with the result that an additional charge must be made for that part which is still left and which is sometimes called obsolescence.

If an error is made in estimating the proper rate to be used, owing to impossibilities of forecasting accurately the useful life of an asset, when that asset is abandoned or scrapped, the sum written off plus salvage may not equal the original cost. If too little or too much has been written off, the difference, whether a debit or credit, should be taken up as a profit and loss item in the year in which the unit is dismantled.

My idea with regard to writing out of the accounts assets which have been dismantled and upon which obsolescence has incurred is first to arrive at the value either as scrap or as a usable product the asset being dismantled. This value should then be credited to Plant Account and charged to wherever it is used. The next step is to charge to the Depreciation Reserve the amount of depreciation set up and credit the Plant Account with such an amount. After these two entries are made there will remain in the Plant Account an amount to be written out to balance the account.

A journal entry should be made crediting Plant Account, thereby balancing the account, by charging an account styled Loss on Property Retired, or some similar name. Occasionally too much depreciation has been set up, and when this is the case the entries to Loss on Property Retired and Plant Account should be reversed.

The question often arises as to whether or not this difference should be pro-rated back over the life of the asset. I do not think it would be wise to do this, for the reason that to do so would cause an endless amount of work and would necessitate steps being taken to go ever further by filing amended income tax returns and apportioning part of the loss back over the years involved.

The most important thing to bear in mind in this whole depreciation problem, and that which I have tried to point out, is that the total cost of the asset must be absorbed by the product turned out during its life and not by any product produced after it has been discarded. This is obvious.

Depreciation of Public Utilities

Another question comes up and that is in connection with public utility concerns, namely, shall depreciation be allowed in determining a just amount that the public utility may operate? My opinion is that public utility concerns must collect from their customers an amount large enough to cover general operating expense, taxes, depreciation, interest on funded and floating inbebtedness, and a fair return to the investors on the money they have invested in the business.

After a prolonged investigation of the subject of depreciation, on December 1, 1926, the Interstate Commerce Commission issued its report and order on depreciation charges, requiring that all steam railroad companies subject to the Interstate Commerce Act and all telephone companies of Classes A, B and C institute a system of depreciation accounting on the straight-line basis, effective January 1, 1928.

The order prescribes the classes of property for which depreciation accounting is required, and in the case of the steam railroads included 36 road accounts and eight equipment accounts, and for the telephone companies 26 classes of property.

The proceedings of the commission were instituted under paragraph 5 of section 20 of the Interstate Commerce Act, as amended by the Transportation Act, 1920, which requires the commission as soon as practicable to prescribe for carriers subject to the act the classes of property for which depreciation charges may properly be included under operating expenses and the percentages of depreciation which shall be charged with respect to each of such classes of property, classifying the carriers as it may deem proper for this purpose.

The hearings before the commission developed a wide and striking difference of opinion upon a basic question partly of fact and partly of theory. Representative of the opposing views are the position of the telephone companies on the one hand and the position of the railroad, gas and electric light companies on the other hand. The commission report gives these opposing views:

The "telephone view." The position of the telephone companies, briefly stated, is that the ultimate expense of furnishing service includes the cost of everything used in the process, whatever it may be. It includes the cost of things that are used up slowly, such as automobiles, switchboards, buildings, pole lines, and other items of plant, just as inevitably as it includes the cost of things that are used up rapidly, such as labor, gasoline, coal, lead-pencils, power and the like. As we understand the view of these companies, depreciation expense represents the cost incurred during an accounting period in the process of using up in service items of physical property, whose lives extend over more than one such period, regardless of how they are used up. This cost is a part of, and should be shown in, operating expense; it should be shown when it is incurred, and it is incurred throughout the life of the property in service. It should, therefore, be charged to operating expense in periodical installments throughout this service life. Replacements, these companies say, do not measure depreciation expense, for it is determined by the amount and cost of the property used up. It exists whether or not the property is replaced, and is incurred regardless of whether depreciation charges are accrued. Such charges should be made in order that the accounts may properly record the facts. As the result of making them a reserve will be created, which will, if the charges have been accurately estimated, at any time equal the loss in existing property due to the process of consumption in service. This reserve protects the integrity of the investment.

The "railroad view." The position of the steam railroad, gas and electric light companies, stated briefly, is that a railroad or public utility property is a composite of many separate units and should be so considered with respect to depreciation. While most of these separate units have terminable lives and are worn out in service or abandoned from time to time for better substitutes, there is no depreciation in the composite property so long as it is well maintained. Maintenance is the making of needed repairs and replacements. If properly maintained, the railroads say, the composite property does not depreciate or lessen in value or serviceability. In fact, it may be worth more to a prospective purchaser when seasoned by long-continued operation than when new. No reserve is needed to protect the integrity of the investment, but the creation of such a reserve may be desirable to spread the cost of retiring certain large units of property and prevent a disproportionate burden upon the operating expense of any one year.

When Does Depreciation Commence?

The question has arisen as to when depreciation commences. Sometimes construction extends over a considerable period of time before operation begins. I understand it is satisfactory to the Treasury Department and common sense dictates that depreciation is first deducted in the year in which the expenditure is placed in operation, and for a period of time extending from the date of the acceptance of the expenditures up to the close of the period for which the return is made. Good accounting practice also dic-

tates that where actual depreciation starts before a unit is placed in operation, such depreciation should remain capitalized and so become a part of the charge to be distributed over the useful life of that unit.

Depreciation rates should be adjusted from time to time as actual conditions warrant. The men on the firing line who are familiar with the facts should work out these adjustments from their actual experience.

It is an unwise policy to accept published rates blindly without making allowance for special circumstances. Some rates being allowed are as follows: Automobiles, demonstration or lesson cars, from 25 to 50%; automobile repairs, tools, 10 to 33⅓%; automobile truck for hauling coal from mine to railroad, 25%; automobile trucks for hauling coal over ordinary country roads, 33⅓%. Factory machinery and fixtures, 10%. Equipment, 10%. Wood flasks, 33⅓%; iron flasks, 16⅔%. Office equipment, tabulating and bookkeeping machinery, scales, etc., 5 years. Office furniture and fixtures built into premises leased for ten years, 10%. Printing equipment, modern high-speed composite, 10%. Mausoleum of concrete lined with granite and marble, 1%. Patents: The life of the patent.

A good way of figuring depreciation on automobiles is to depreciate them over a period of three years down to 20% of their cost, stopping when this point is reached. I don't know of a case where the trade-in value of an old car at the end of three years has been less than 20% of its cost, therefore this is a safe method.

I understand some companies set up depreciation based on operations; that is, if they operate 80% of capacity and their normal rate of depreciation is 5%, their rate for the year will be 4%, which is 80% of 5%. I do not recommend this practice, because I thoroughly believe that practically all assets depreciate about as rapidly standing idle as when running full.

Depreciation Differs for Same Equipment

It should also be borne in mind that all industries of a similar nature do not take the same rate of depreciation. Two units of an identical nature performing similar work, one located in Florida and one in Duluth, owing to climatic conditions, may take different rates for reasons that are obvious.

This leads me to remark that the nature of the work should be taken into consideration, your business and my business having different rates for different units because we are in different businesses.

In the cement business we considered all sides of the question fully when we made up the standard rates for the whole industry. After we had agreed on the rates among ourselves we took the matter up with the department at Washington and they approved them, recognizing the elements I have mentioned, with the result that their approval gave us fair rates of depreciation, and these rates are used generally by all the cement companies.

In my judgment, each line of business similar in character or kind should get together and agree on rates, and then take the agreed-upon rates up with the Revenue Department for approval. I am sure from what I have heard that they will be glad to approve any rates that are reasonable, which is all that is necessary to convince the department.

The bottle manufacturers and the cement industry are two industries that have classified their assets and adopted standard rates for depreciation.

Depreciation and Repairs

Taking up now the question as to where the line is to be drawn between depreciation and repairs, I shall give you some personal observations. One method pursued quite successfully is to base it on the question, Can you operate without repairing the machinery? If you can, consideration is to be given to capitalizing it. If you cannot, and you have to repair the machinery before you can operate, it is, usually, in ordinary cases, a charge to repairs and maintenance.

My opinion is that this method has some merit, although it is far from perfect. Moreover, the Revenue Department will probably look into questions of your repairs, whether or not they are too high. A good way to determine whether your repair charges are too high or whether your depreciation rates are too low, or vice versa, is to look into your repair charges and analyze them carefully. If they are too high it may indicate many things; defective material in the machinery causing too rapid depreciation, or improper care of the equipment, or other causes. These are just suggestions that may have a bearing on your rate.

Building Depreciation

Changes made in an existing building are chargeable to Fixed Assets as part of the cost of the building only to the extent that they increase the size or value of such building. Ordinary repairs, such as replacing broken window panes, repairing plumbing and heating system, painting inside and out, even though the life of the building be prolonged by such painting, are in my opinion not proper charges to Plant Account, for the reason that the upkeep of the building should be considered in fixing the rate for depreciation.

To illustrate: If a wooden building without paint and upkeep would last 25 years, then the rate for depreciation would be 4%, whereas with painting at time of construction, and from time to time, and other upkeep, the building normally lasts 30 years, the rate is 3⅓%. Therefore a rate for depreciation should always consider the life of a building properly maintained by charging upkeep to operating expense.

Take the replacement of a roof on a building. It is a well-known fact that a building will outlast several ordinary roofs; therefore, in a replace of this kind, the question arises as to whether the charge should be made against capital or expense. If this charge is to be made to capital account, then a rate for depreciation high enough must be set up to take care of the rapid wear to the roof; if the replacement charge is to be made to current operating expense, then a lower rate for depreciation obviously should be used.

As an example, take a brick building which it is estimated will last 40 years and for which a depreciation rate of 2½% is taken up yearly. At the end of 40 years the original cost of the building will have been depreciated. Suppose, for easy figuring, that at the end of 20 years (this with an ordinary roof is not too long) the old roof is worn out and must be replaced by a new one. If that replacement were charged to the depreciation reserve based on a 2½% rate, at the end of 40 years the reserve would be deficient because one part of the building wore out faster than original calculations had anticipated; however, the replacement is in kind and is an absolute necessity, and usually is not anticipated in original depreciation calculations, consideration should be given to making the charge to current operation. This may mean that should this charge all be made in one period it would greatly distort costs. In that case the amount of the replacement should be spread over several months so as to keep the costs in line as much as possible. Standard costs are applicable here.

There is another method of handling this through Fixed Assets by setting up one rate of depreciation for the building itself and one rate for the roof, the rate for the roof being twice the rate for the building because of its very much shorter life.

Plant or Unit Depreciation?

Again, the question has been raised as to whether an average rate should be charged for the whole plant or a unit rate should be used. In answer, that if you cannot define your units down to a point fine enough, it may be possible to use an average rate for your whole plant, exclusive of land. I don't think you will have much trouble, or get into difficulty with the Internal Revenue Department in following this plan, providing you are conscientious and use it consistently.

Depreciation is a much misunderstood problem in most lines of industry, for the reason that all of the facts in connection with it are not known. To get the right perspective, one should always bear in mind the nature of the business, whether it is one of continuous operation, 24 hours per day and 365 days per year; the kind of work the machinery is performing, i.e. is the work light or heavy, and other peculiarities. Take the business with which I am most familiar, where it is one of continuous operation, 24 hours per day and 365 days per year, and where the machinery is of an unusually heavy type with large electrical and mechanical units requiring a heavy investment,

and where heavy, gritty raw materials such as limestone, shale, clay and coal pass through this machinery, causing it to wear out rapidly, resolves itself into the fact that the cement business is one requiring a very heavy rate for depreciation on this high-priced, short-lived equipment. Then take depreciation on some machine shop where light manufacturing is done this resolves itself into the fact that consideration must be given to the particular nature of that business in fixing the rates for depreciation on it. Depreciation should be charged on the basis of the estimated life of the asset. These estimated rates should be broad and comprehensive and all-inclusive.

Basis of Estimates

We must remember in the final analysis that the depreciation question and the rates that we use are only estimates. They are estimates that we think based on past experience to be correct. They are the best we can do and the best we can make. With the study we have given our several businesses, I think those of us who are accountants, or engineers, are qualified to make those rates on those units, and that we should stick by those rates and not let anyone swerve us from our basis.

Mr. Wharton of Deere & Co. has so ably stated the reasons for the inclusion of depreciation charges in our cost figures that I quote them herewith:

(1) That depreciation takes place regardless of every effort to prevent it and regardless of any belief to the contrary.

(2) That depreciation should be taken up on our books even though there are no profits out of which it can be taken; because our books should always tell the truth. We may sometimes unintentionally deceive others, but we should never deceive ourselves.

(3) That depreciation should be included in the cost of our goods and should be taken into account by the entire industry in fixing selling prices.

(4) That we may be generous and give away this depreciation to our customers; but in doing so we should realize that it is our stockholders' money we are giving away, and such a policy may result in disaster.

Modern Gypsum Plaster Plant of Germany

THE gypsum industry has lived through many stages of costly processes, wasting heat and labor, until it reached its present stage, which is more efficient and economical, though it requires a considerable investment. The problem of grinding the rock before it enters the kiln was solved with the advent of hammer mills operating at great speed.

The modern equipment, as furnished by the Alpine Machine Co., Augsburg, Germany, is illustrated herewith. The gypsum rock is crushed in the crusher *a* and is delivered to the silo by means of a bucket elevator *b*. An automatic discharge feeds the rock to the hammer mill *c* with perfect uniformity. The rock is ground in the mill and transported by the bucket elevator *f* and the screw conveyor *g* to the silo *h*, from which it is fed directly into the kettles *i*. The latter discharge automatically into the coolers. If great fineness is desired, the gypsum is transported upon cooling by the screw conveyor *k* and the bucket elevator *n* into a separator *p*, where it is separated according to size. The pulverized product is discharged into the silo *q*, *r*, *s*, *v* by means of the bucket elevator *m* and screw conveyor *x*. From the silos the gypsum is drawn into bags. The coarser material delivered from the kettles may either be recovered directly from the coarse outlet of the separator, or it may be further pulverized in a Simplex-Perplex mill *o* and also discharged by the conveyor *m*, if large quantities of fine material are required.—*Tonindustrie-Zeitung.*

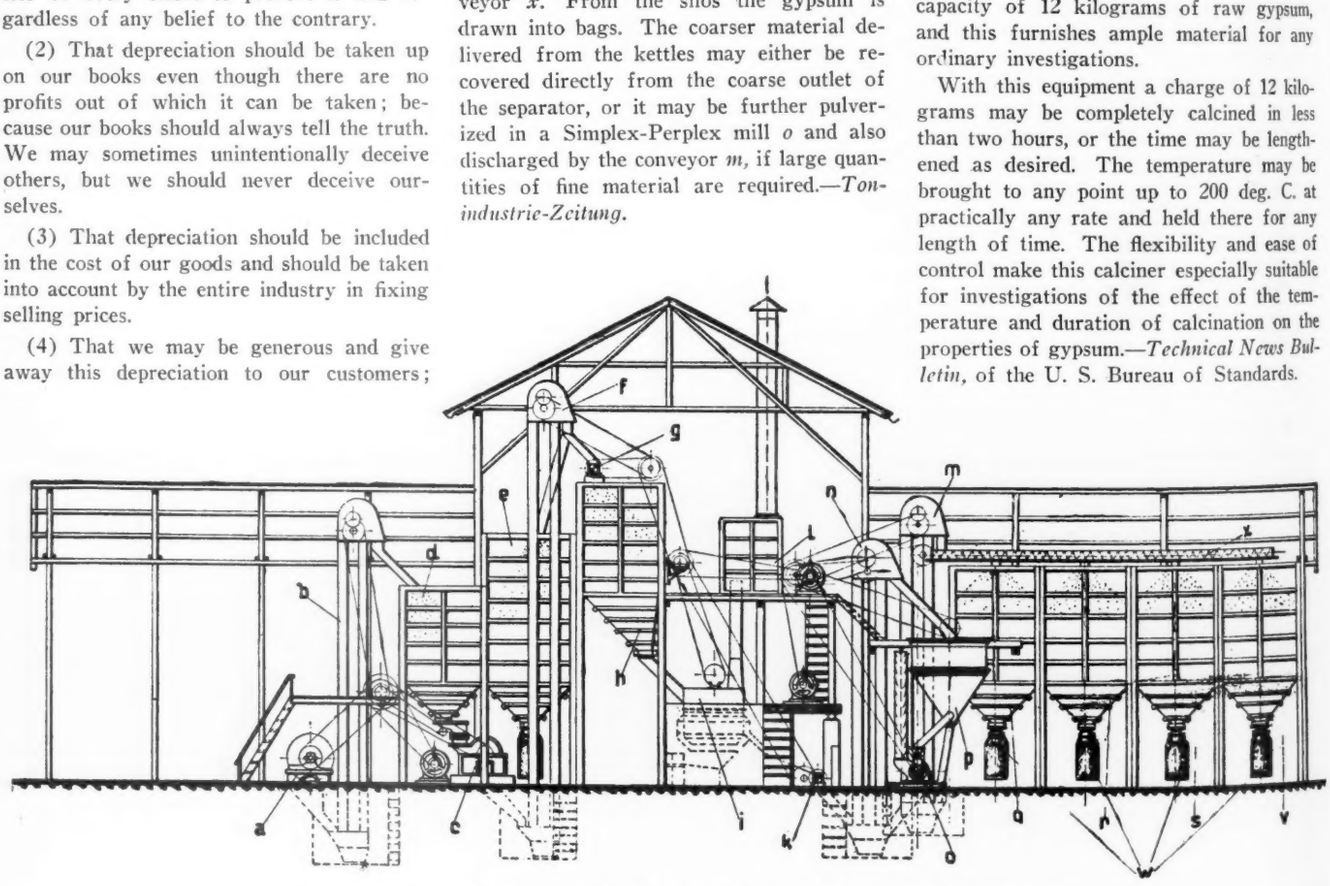
An Electrical Calciner for Gypsum

IN the commercial calcination of gypsum the procedures followed by various manufacturers differ widely, particularly in regard to the temperature and time of calcination. While it has been believed for a long time that variations in these factors would vary the quality and properties of the product, very few attempts have been made to determine quantitatively the magnitude of these changes.

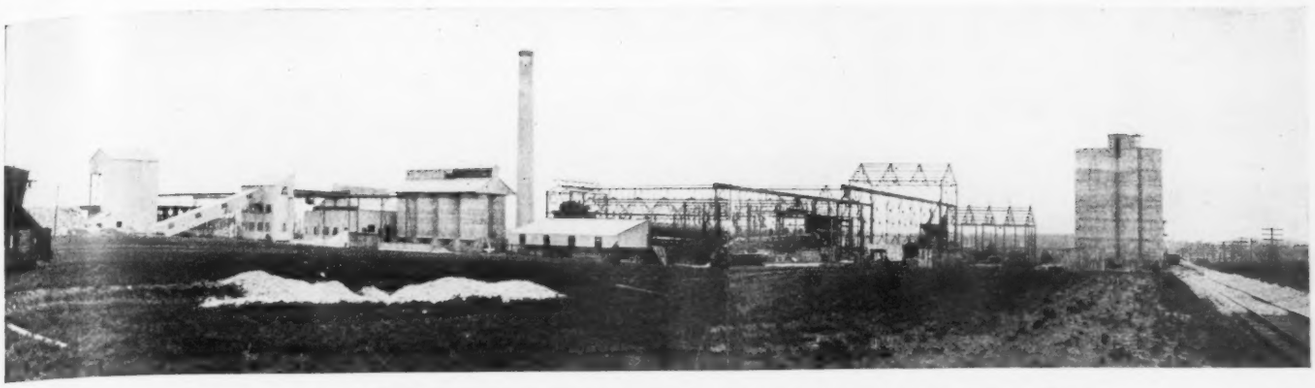
Three years ago the U. S. Bureau of Standards undertook some investigations of this phase of gypsum technology, and the results have appeared at various times in the technical press. The apparatus used in this work has recently been replaced by a larger and improved model, which appears to satisfy fully the requirements for such experimental work.

The apparatus consists of a drum, slowly revolved by an electric motor. Automatic valves are provided which allow the escape of steam as the material calcines, but which prevent the loss of the finely ground gypsum. The heating is done by four electrical resistance units which are inclosed in the drum. These units are so arranged that they may be connected in parallel, in series parallel, or two may be disconnected and the remaining two used in parallel. With these connections and with an exterior resistance in series with them a wide variation in power input may be obtained. The calciner has a capacity of 12 kilograms of raw gypsum, and this furnishes ample material for any ordinary investigations.

With this equipment a charge of 12 kilograms may be completely calcined in less than two hours, or the time may be lengthened as desired. The temperature may be brought to any point up to 200 deg. C. at practically any rate and held there for any length of time. The flexibility and ease of control make this calciner especially suitable for investigations of the effect of the temperature and duration of calcination on the properties of gypsum.—*Technical News Bulletin*, of the U. S. Bureau of Standards.



Cross-section of the gypsum plaster mill of German design and equipment



Panorama of the new plant of the Cumberland Portland Cement Co., Cowan, Tenn.

Progress on the Cumberland Portland Cement Company Plant in Tennessee

COWAN, Tenn., where the new plant of the Cumberland Portland Cement Co. is situated, is on the N. C. and St. L. railway about half way between Chattanooga and Nashville. It is in a limestone country and on the other side of a mountain is the well-known Gager lime plant at Sherwood. The quality of the limestone quarried here was the main reason for building the plant at Cowan, for one of its products is to be white cement, which requires raw materials almost free from iron.

White-burning clay, the other raw material used in the manufacture of white cement, is obtained from eastern Tennessee.

The plant had not been completed when it was visited in the early part of April, but it was expected to go into production in about two months. Practically all of the heavy machinery was in place and the power plant and the crushing plant were in operation. The quarry had been opened and a stock pile of rock crushed to the size required to feed the raw grind mills were ready to run but the special machinery for grinding white cement had not been placed, although the finish grind mill for gray cement was practically ready to go, only the installation of motors being necessary.

Quarry

The quarry is about 1200 ft. from the plant and 80 ft. above it, giving a downhill grade for the loaded cars. This grade has been cut down by a fill and the trestle which brings the loads on the second floor of the crusher house, where they can be dumped to the primary crusher, which is on the ground level.

The quarry is in the Warsaw formation of the Mississippian system lying under the St. Genevieve formation which produces so much lime in the region about St. Louis. An analysis of two representative samples is found in the table below:

ANALYSIS OF LIMESTONE AT COWAN QUARRY

	No. 1	No. 2
SiO_2	1.18%	0.86%
CaO	53.70%	54.10%
R_2O_3	0.38%	0.42%
MgO	0.70%	0.69%
Loss on ignition	43.45%	43.64%
	99.41%	99.71%

Of the R_2O_3 only a small part is iron, some samples showing hardly more than traces of this discoloring material.

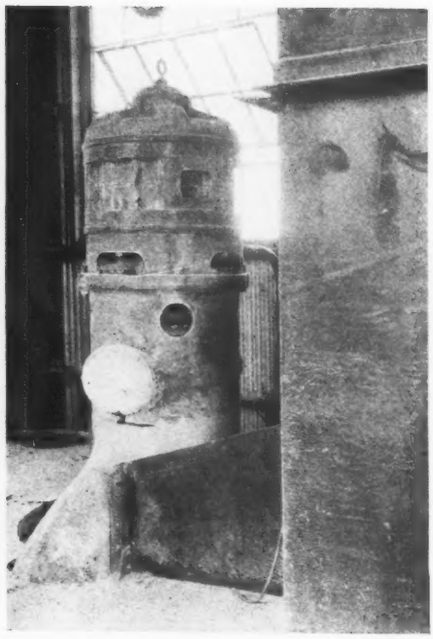
View of recently opened quarry at Cowan, Tenn., showing one of the three steam locomotives used for hauling

The system of quarrying adopted is to put down 6-in. well-drill holes with an Armstrong all-steel drill of the new model. The bit used with this drill is of a modified fish-tail type which has not been noted before in any limestone quarry. It is shown in one of the accompanying pictures. The holes are 16 ft. apart and the average burden is 22 ft. As one would expect to find in the edge of a hillside deposit there are some clay seams and water courses, and to insure the opening of the quarry to a good working face, a study was made of these and the first shots were diagramed to show the character of the rock with sections through the burden of the principal holes. The powder charge in each hole was adapted to the conditions shown by the diagram, with the result that the first shots left a straight face with no toes or "breaking back" to interfere with later quarrying operations.

The quarry is in charge of L. B. Rifesneider, who has had charge of open pit mines and quarries in many parts of the world. He has had a mining engineers' experience and has been employed most of the time by one of the large iron and steel companies.

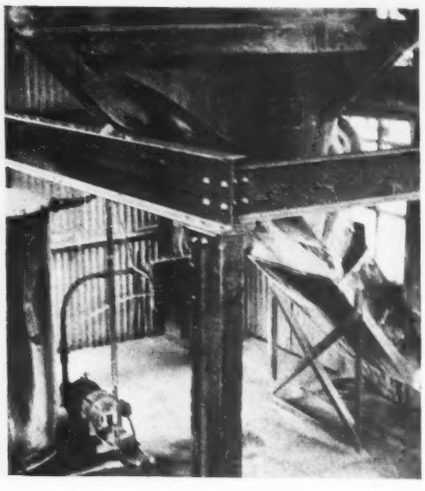
The broken rock is loaded into 6-yd. Western side-dump cars by a Marion No. 32 electric shovel. These are drawn to the primary crusher by three steam locomotives, two of the Shay type and one of the ordinary pattern. All three were purchased from the N. C. and St. L. railway.

Clay for making gray



View of finishing crusher, showing direct connected shaft motor

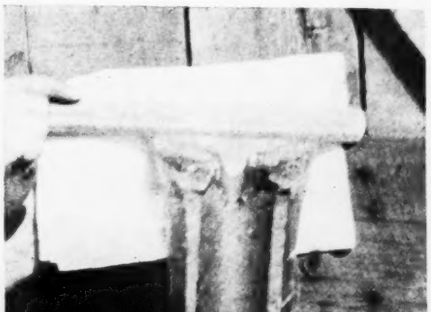
cement comes from a bed near the plant where it is dug by a steam shovel and loaded into gondola cars. These are unloaded at the plant by the same traveling crane that handles the rock. The crane also loads the clay into the wash mill, by which it is prepared for the raw grind mills.



View of finishing crusher, showing oil tank and pump

Plant Layout

The layout of the plant is like the letter L turned backward, with the crushing and raw grind departments on the short arm of the L. These are in three buildings. In the first of these is the No. 18N Allis-Chalmers gyratory crusher driven by a 150-hp. motor of the same make through a belt. The discharge goes to a 30-in. conveyor belt of 80-ft. centers, which takes it to a steel bin 12 ft. high, holding about 40 tons, from which it is fed to the No. 10 Newhouse (Allis-Chalmers) crusher, by which it is broken down to the size to feed the raw grind mills.



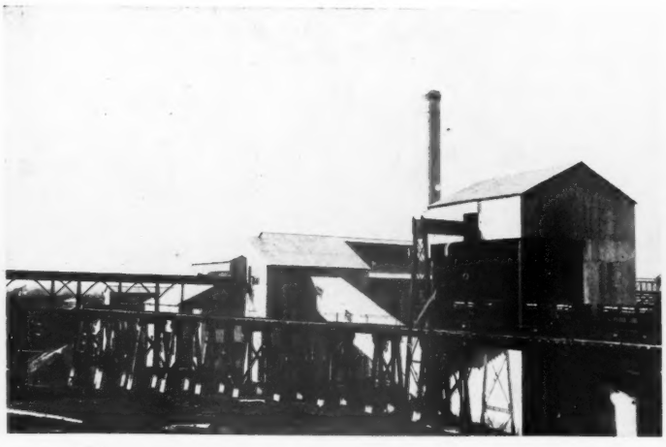
Modified fish-tail type drill bit used on well drill

This is believed to be the first installation of this type of crusher in a cement mill, so some description of its work may be of interest. The stone received from the primary crusher is broken down to 4-in. ring and finer and is crushed by the Newhouse to ¾-in. and finer at the rate of 75 tons per hour. The machine is of the direct-driven type, the vertical motor being on top of the machine, connected to a long shaft that runs down to an eccentric at the bottom. It runs at 860 r.p.m.

New type of steel well drill used in the quarry

A peculiarity of this crusher is that it is suspended and not supported. All the weight is carried on four short pieces of wire cable which are attached to eyebolts in the steel beams under the floor and to the frame of the crusher. This frame carries a housing and the spout by which the discharge passes to a conveyor.

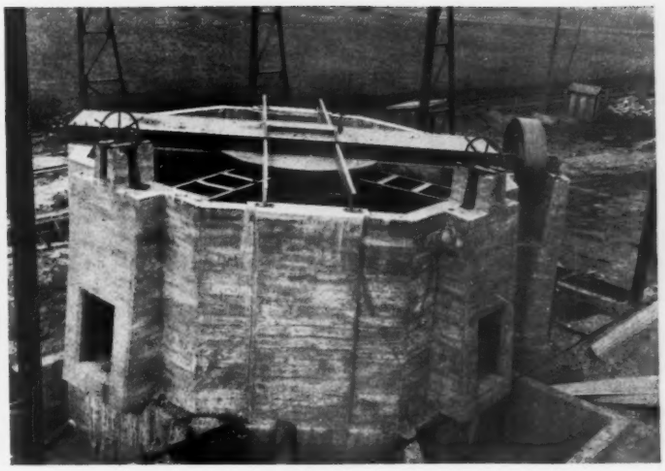
Lubricating this machine was one of its main problems, the high speed and the heat developed by crushing at such a rate making an unusual condition. The lubricating system consists of a rather large oil tank and a pump driven by a small independent motor which keeps a constant circulation of oil



The crushing plant and trestle line from the quarry

Looking into the No. 18 primary crusher

Rock storage between crushing plant and raw-grind buildings and 15-ton crane



Looking down on the wash mill. The construction is of steel and concrete

through the bearings. The bearings are carefully protected from the entrance of dirt and grit by dust caps and packing, so that the oil was free from dirt when it was inspected on the day the plant was visited. Some experimenting was needed to find a satisfactory oil, but the oil then in use kept the bearings at 120 deg. F. and the eccentric bearing was good for three months' wear. The motor is rated at 100 hp.

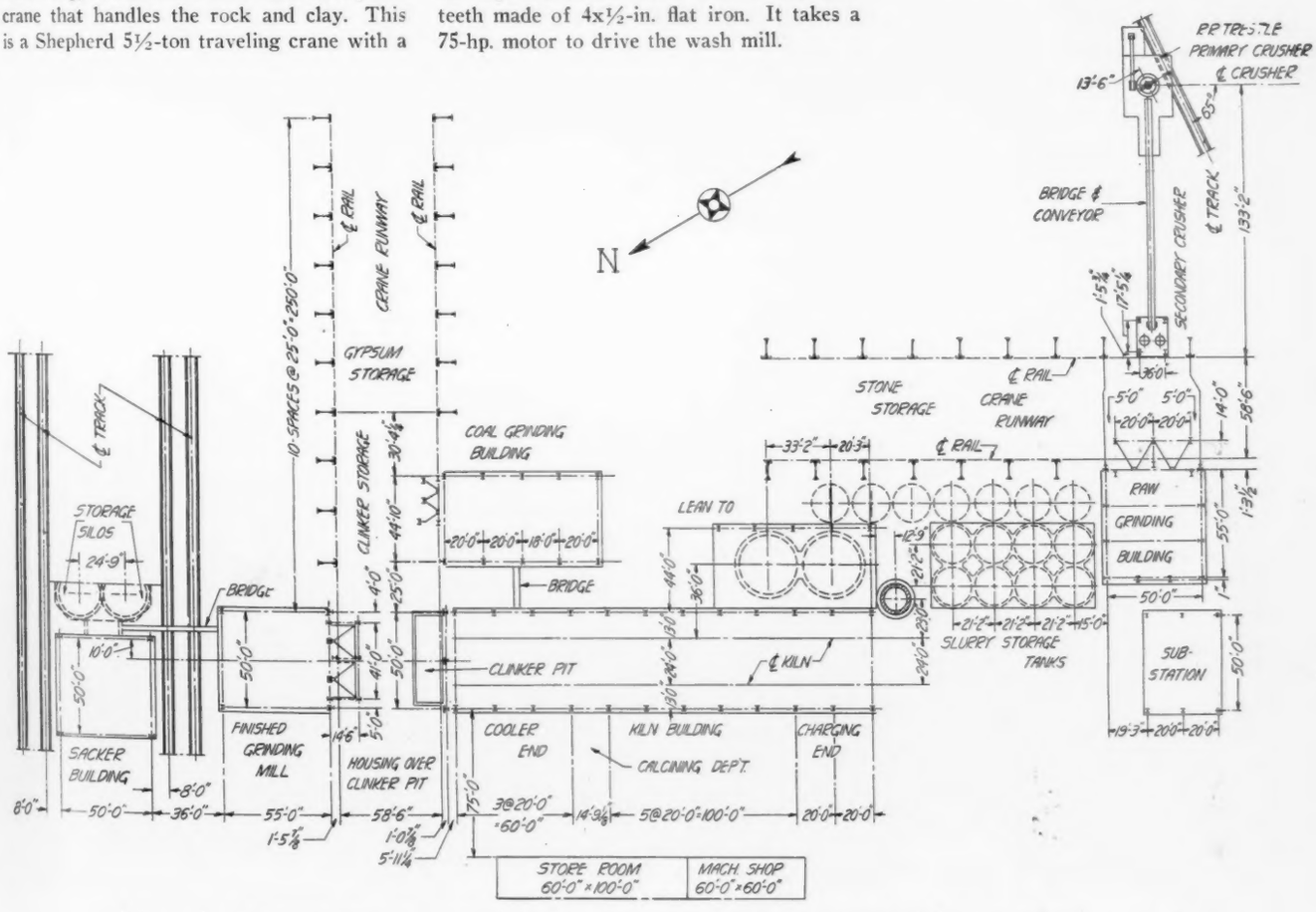
The discharge of the Newhouse crusher falls into a pit 30 ft. long, 14 ft. wide and 8 ft. deep, from which it is removed by the crane that handles the rock and clay. This is a Shepherd 5½-ton traveling crane with a 2-yd. Blaw-Knox bucket. The storage space covered by the crane (for rock) is 58 ft. 6 in. wide and 225 ft. long and the craneway extends beyond this to a shorter clay storage and the wash mill for about 75 ft.

Wash Mill

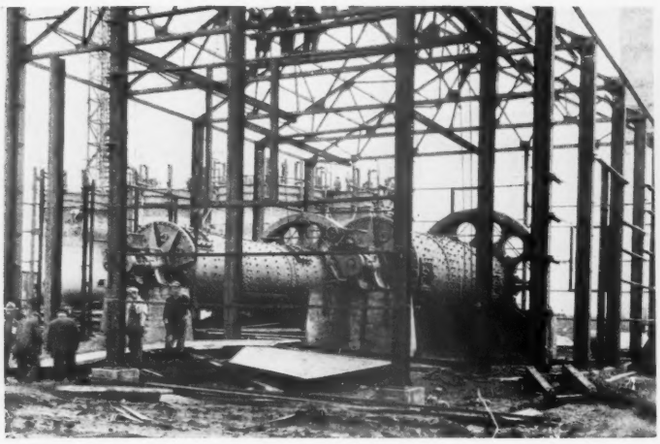
The wash mill is of Allis-Chalmers make. The outside walls and the bottom are of reinforced concrete and the machinery is carried by a steel framework which rests on the walls. The drags, which cut the lumps of clay and mixes them with water, have teeth made of 4x½-in. flat iron. It takes a 75-hp. motor to drive the wash mill.

After the clay has been thoroughly mixed with water so as to form a slip, it is pumped by a centrifugal pump to two square concrete storage tanks 12 ft. deep and 14 ft. square. From these it flows to the raw grind mills.

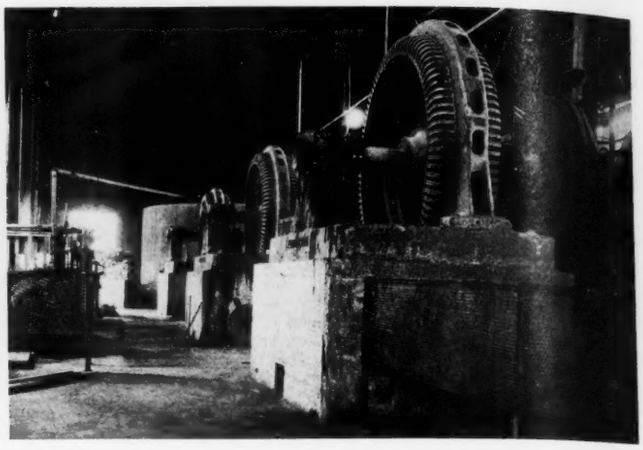
In the raw grind department are three 7x26-ft. Allis-Chalmers compeb mills of standard type, each driven by a 500-hp. Allis-Chalmers synchronous motor through a Cutler-Hammer magnetic clutch. Manganese



General plan of the Cumberland Portland Cement Co.'s plant at Cowan, Tenn.



Compeb mills in the finish-grind department



Synchronous motors with magnetic clutches driving raw-grind mills

steel linings are used in all compartments of these mills, and the grinding medium is "concavex" steel balls. The slurry flows to two 5x5-ft. compressed air slurry pumps. These are of a new type, recently introduced by Allis-Chalmers, which have the valves operated by electricity through a solenoid.

Slurry Tanks

These pumps discharge into a line which runs over eight slurry tanks which are 20 ft. in diameter and 32 ft. high. The slurry in these is agitated by air through a device which is said to be new in cement mills, although it has been used in some other industries. The novel feature is the head or jet from which the air issues. This is made from a short piece of 2-in. pipe, closed at both ends except where the 1-in. pipe that brings the air to it enters. In the side of the 2-in. pipe a number of small holes are cut and these are covered with a rubber "stocking," a short piece of elastic rubber tubing. When the air is turned on, the pressure forces the stocking away from the holes and allows the air to escape from them into the slurry. When the air is turned off the stocking closes the holes so that the slurry cannot enter to clog the pipes. There are 23 of these agitating heads in each tank.

From the slurry tanks the slurry flows by gravity to two correction tanks, 32 ft. in diameter and 18 ft. deep, which are placed below the kilns, at one side. From these it is pumped to the kiln feed tank by a compressed air slurry pump of the same size and type as that used to pump from the raw grind mills to the slurry tanks. The kiln feeders are of the usual Ferris wheel type made by Allis-Chalmers. In addition there is a No. 1 Reeves feeder which varies with the speed of the kilns so that the feed will vary with the kiln speed. The slurry valves and fittings are the patented type made by the Merco Nordstrom Valve Co.

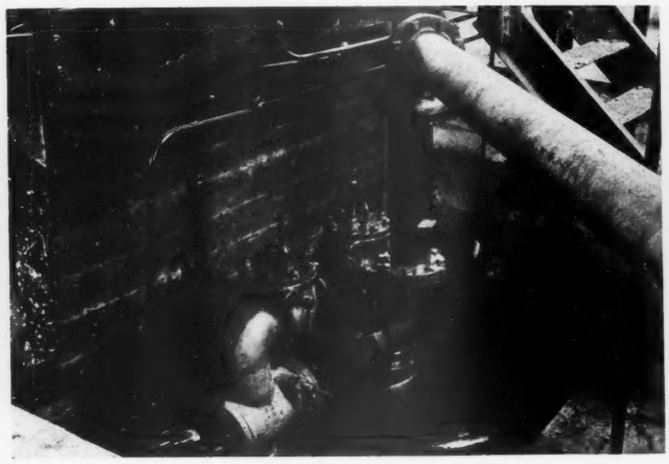
Kilns

The kilns are 10 ft. in diameter and 150 ft. long, of Allis-Chalmers make. They are fired with powdered coal prepared in a 6x22-ft. compeb mill, after being dried in a 50-ft. cylindrical dryer. The coal grinding plant is at one side of the kiln house and near it so that the coal can be easily conveyed to two 7-ton hopper type bins above the kilns. From each of these the powdered coal is withdrawn by a double 14-in. screw and sent to the burner, which is supplied with air by an American Blower Co.'s "Sirocco" fan driven by a 25-hp. direct-connected motor.

The kilns are supported on two bearings and are driven through a Link-Belt silent chain and gear and pinion by a 50-hp. variable speed motor. They turn very easily, as was shown during construction, when they were turned by putting a rolling hitch of rope on them and pulling on the rope with a Ford truck.

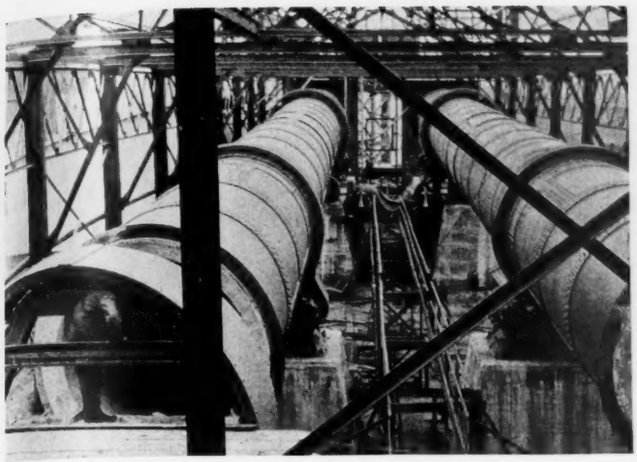
The cooling system in this plant is rather unusual, for instead of the hot clinker going to the usual revolving cylindrical cooler it goes to a small pit from which it is drawn out by two drag chains 9 in. wide made by the Chain Belt Co. These take the hot clinker to a pit which is 50 ft. long 14 ft. wide and 12 feet deep. From this it is removed by the clinker storage crane which is a 5½-ton Shepherd crane with a 2½-yd. Blaw-Knox bucket a duplicate of that which handles the stone and clay. The runway for this crane extends at right angles to the kilns and is 300 ft. long. Gypsum will be stored in one end of it and the entire storage space served by this crane will be covered in to keep the contents dry. It is planned to extend the storage space as the necessity for this develops.

The kiln stack is 150 ft. high 9 ft. in diameter at the top and 14 ft. at the base. It is built of reinforced concrete and lined with radial brick and there is an air space

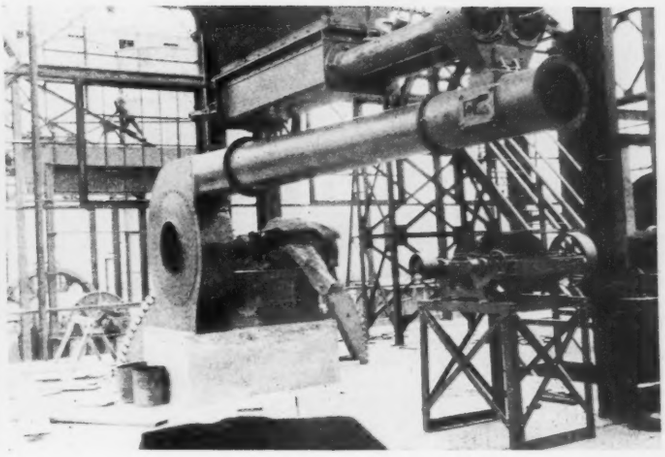


Slurry pumps in the raw grind department

Special valves and fittings on the slurry tanks



Construction view of the two 10x150-ft. rotary kilns



Double screw feeder for pulverized coal and fan

between the stack and lining. It was designed and built by the Rust Engineering Co.

Grinding Departments

When the plant is complete there will be two finish-grind departments one for gray and one for white cement. That for gray cement contains two 7x26-ft. compeb mills, the same as used in the raw-grind department. Manganese steel will be used for lining and "concavex" balls from 2½ in. to 5 in. will be placed in the first compartment.

Back of the mills is a 14-in. screw conveyor to receive the product (now cement) and take it to a 42-ft. elevator discharging to a second screw conveyor and elevator placing the material in the silos. There are six silos for gray cement, each 60 ft. high and 24 ft. in diameter. The spaces between them have been made into bins by building walls between the silos, and the whole will hold about 40,000 bbl. Screw conveyors will take the cement from these bins to the pack house, in which two Bates valve-bag packers will be installed. The white cement will be conveyed to its six silos by a Fuller-Kinyon pump.

Except for the separate finish-grinding department, the plant has no special machinery to adapt it to making white cement. In fact, it is supposed both kilns will run on gray cement part of the time, unless the market developments for white cement should take the continuous output of one kiln.

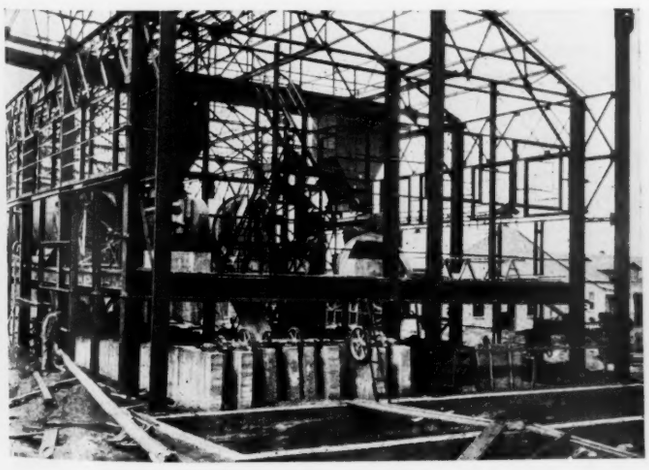
Oil and Powdered Coal for Burning

When white cement is to be made, white clay will be substituted for red clay and the slurry held separate in the storage tanks. The kiln chosen for burning this will be converted to oil-firing in place of powdered coal. Of course all the auxiliaries, such as the clinker pit and storage space, will have to be thoroughly cleaned before white clinker is discharged to them. Firing with oil is the novel part of this program, as usually white cement has been made in kilns fired with producer gas. But it is possible to regulate oil to produce a smokeless flame, and it is so used in many other industries, one specific instance being in the drying of gypsum products. The process of white cement making is a matter of method rather than machinery. The kilns have to be run to produce a lower output and the temperature must be controlled with some care.

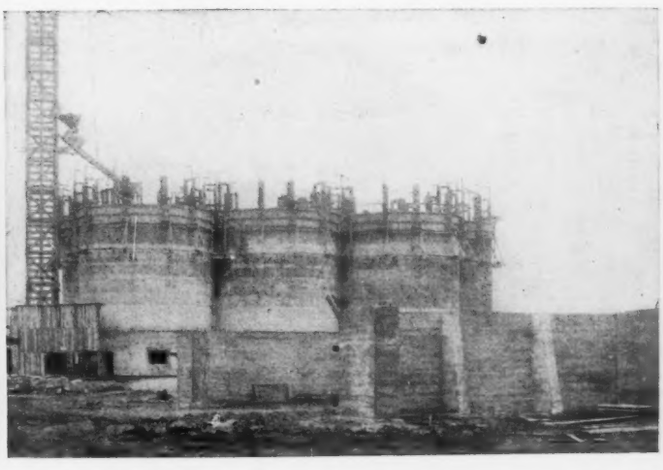
Recording Bristol pyrometers are to be attached to the kilns and an optical pyrometer used for immediate readings and as a check. A gas analysis apparatus of the type used by the United States Steel Corp. will be connected to the stack.

Power Plant

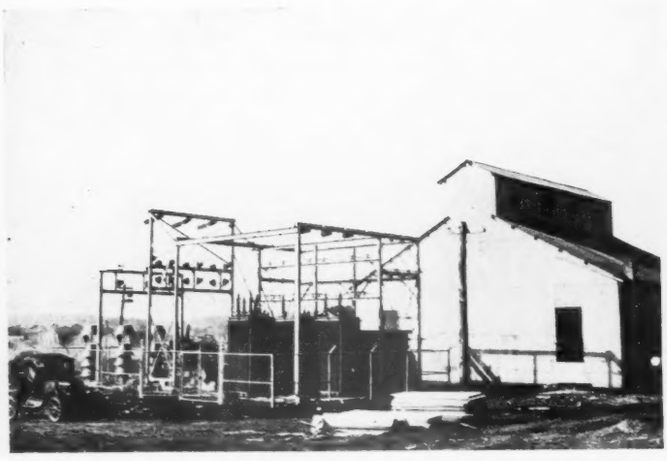
The power house, or electrical substation, and the transformers, are placed at the angle of the "L" between the crushing department and the kilns. The transformers are set in the open air. The main switchboard is in the power house along with three motor generator sets which are used as energizers, or exciters, for the synchronous motors employed on the compeb mills and tube mills. Two of these are sufficient to furnish the current for this purpose, and the third will be held in reserve. The power house also contains three Ingersoll-Rand compressors. Two of these, each of 750 cu. ft. capacity, furnish air for secondary drilling, and the third is a low pressure machine to furnish air for agitating the slurry tanks. Each compressor is driven by a 100-hp. motor. All the electrical equipment, not only in the power house but all through the plant, was fur-



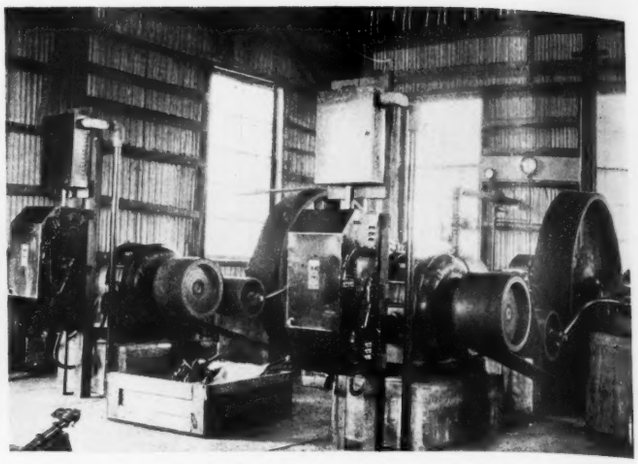
The concrete clinker cooling tank with drag-chain foundations under the building



Constructing the six 60x24-ft. cement-storage silos with sliding forms



The plant power house, showing the transformers; taken during construction



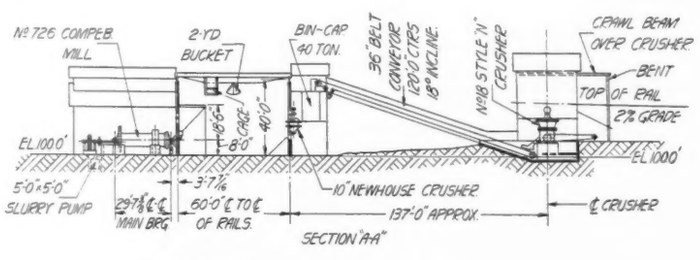
Two of the air compressors installed in the power house; power current is purchased

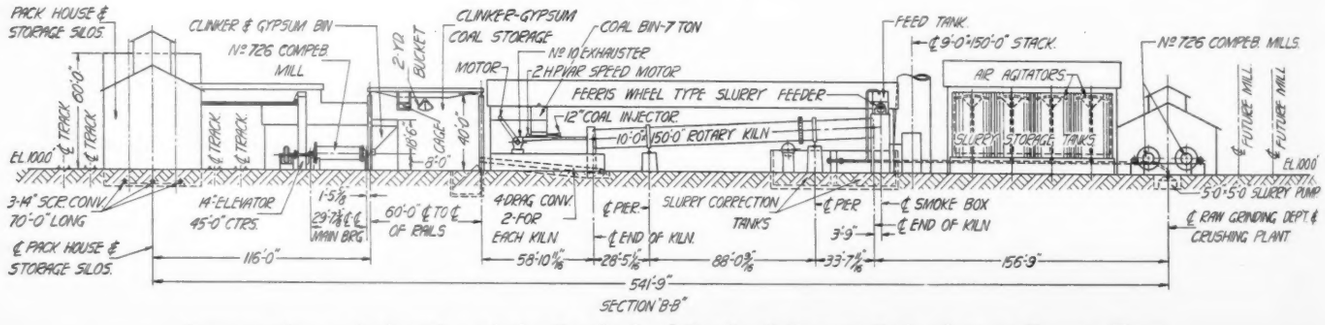
nished by the Allis-Chalmers Manufacturing Co. Current is purchased from the Southern Cities Power Co.

Office and Laboratory

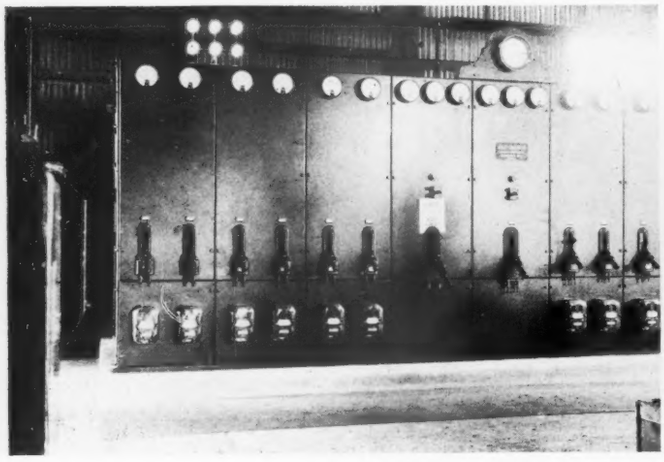
The business office and laboratory are housed in a handsome brick building. The laboratory is in charge of Walter Ernst, chemist, who was with the Hidalgo company in Monterey, Mexico, until he came to this position. He is a son of W. S. Ernst, who is in charge of the South Dakota state cement plant, an occasional contributor to Rock Products. The chemical laboratory is equipped with "Chainomatic" balances, a Hoskins heavy duty electric furnace and a small fusion furnace, besides the usual analytical apparatus. All the solutions for analytical work are kept in the dark and out of the heat in closets underneath the benches, and are pumped to the burettes by a rubber bulb. The hood has a partition, one side being for the hot plate and the other for the furnaces.

The physical laboratory has a moist closet of Mr. Ernst's design, which is built of reinforced concrete and has glass shelves. It contains a wet and dry bulb thermometer and can be arranged for thermostatic control. The laboratory also contains the usual benches

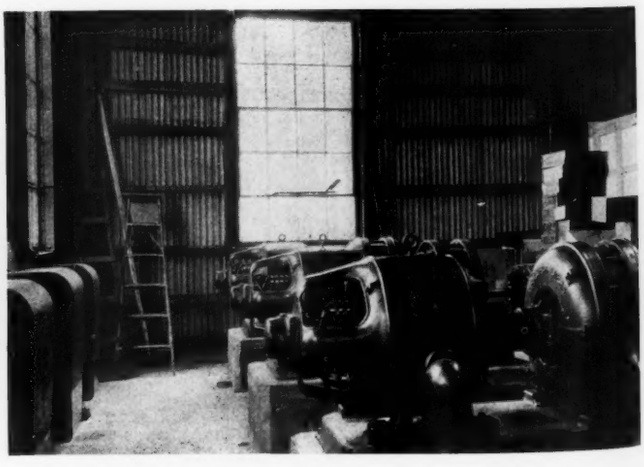




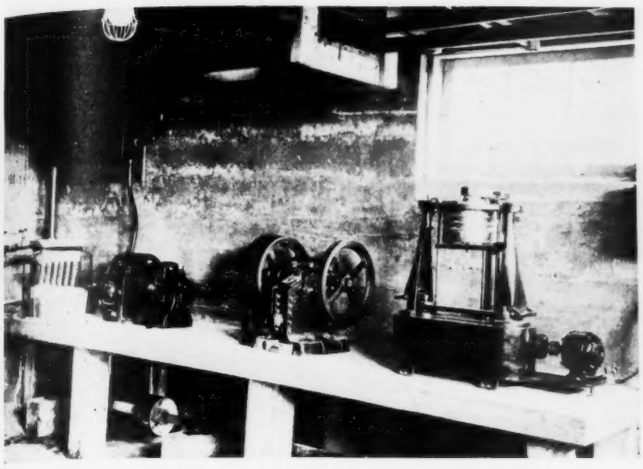
Cross-section and elevation of the Cumberland Portland Cement Co.'s plant at Cowan, Tenn.



The switchboard in the power house



Direct current "energizers" in the power house



Grinding and sampling equipment in the physical laboratory

Walter Ernst, plant chemist, in the chemical laboratory

and tanks for making and curing briquettes and for the usual physical tests. It is equipped with an Olsen breaking machine of the latest model. In the cellar is the grinding room, in which are installed a Braun crusher and Braun sample grinder and a Ro-Tap machine for making screen tests.

The design and layout of the plant were by O. H. Sawdy, consulting engineer, who has also been superintendent of construction. Mr. Sawdy designed and superintended the construction of the Hermitage cement plant in Nashville and has designed a number of other plants in various parts of the country.

The manager of the plant is R. T. Miller, who was manager of the Hermitage plant at Nashville before he came to the Cumberland company. The officers are W. V. Davidson, president, of Nashville; J. R. Greene, vice-president, of Cowan; H. M. Greene, secretary and treasurer, of Nashville; and C. V. Hicks, assistant secretary and treasurer, of Nashville. Frank Pearson is assistant general manager.

Atlanta Gypsum Charters Boats

SHIPMENTS of gypsum will soon be coming to the Portsmouth, N. H., plant of the Atlantic Gypsum Products Co. and will continue weekly throughout the summer. Two Norwegian steamships, the *Pluto* and *Gida*, have been chartered for the runs between Walton, N. S., and Portsmouth. The ships will also deliver cargoes at New York. The first cargo is expected shortly.—*Manchester* (N. H.) *Mirror*.

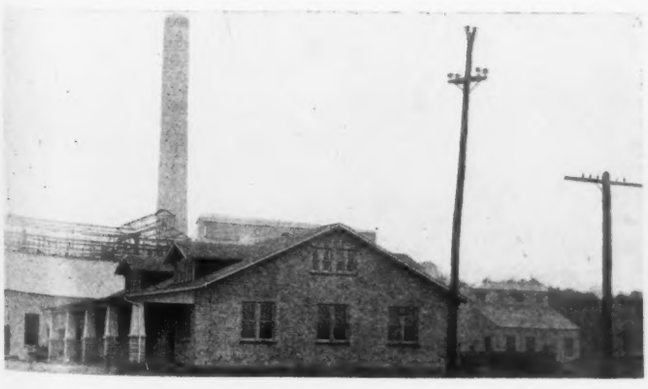
New Gypsum Company for Canada

THE Seneca Gypsum Co., Ltd., Hamilton, Ont., has been organized by L. S. Minchin of Hamilton. The authorized capital is $500,000, divided into 100,000 shares of $5 par value. To date, according to L. S. Minchin, about 2000 shares have been subscribed for and an offering of 10,000 shares is being put out. The money realized from their sale will go toward the completion of project work at the mines. An additional offering of 10,000 shares will then be made to provide for the erection of a calcining plant. According to information, the company owns, and has under lease 1191 acres at Caledonia, Ont., where a shaft has been sunk to a depth of about 115 ft., which is supposed to be within a short distance from the main gypsum bed. The personnel and directors of the company are: F. L. Snively, Hamilton, president; T. G. Moore, Caledonia, treasurer; L. S. Minchin, organizer, and W. T. Walsh, Hamilton, mine manager.

A Unique Paperweight

THE National Gypsum Co., Buffalo, N. Y., has distributed some quite unique paperweights, each in the form of a piece of gypsum rock from the company's new mine near National City, Mich.—a rock said to be 99.76% pure $CaSO_4$. The pieces are roughly 3 or 4 in. square and are enclosed in glazed paper covering to keep them clean. As many dealers and users of gypsum products have no conception of what the original gypsum rock looks like, these samples are doubtless welcome in satisfying a normal human curiosity. With them goes a little booklet emphasizing the effect of purity on the quality of the finished product.

A gypsum paperweight

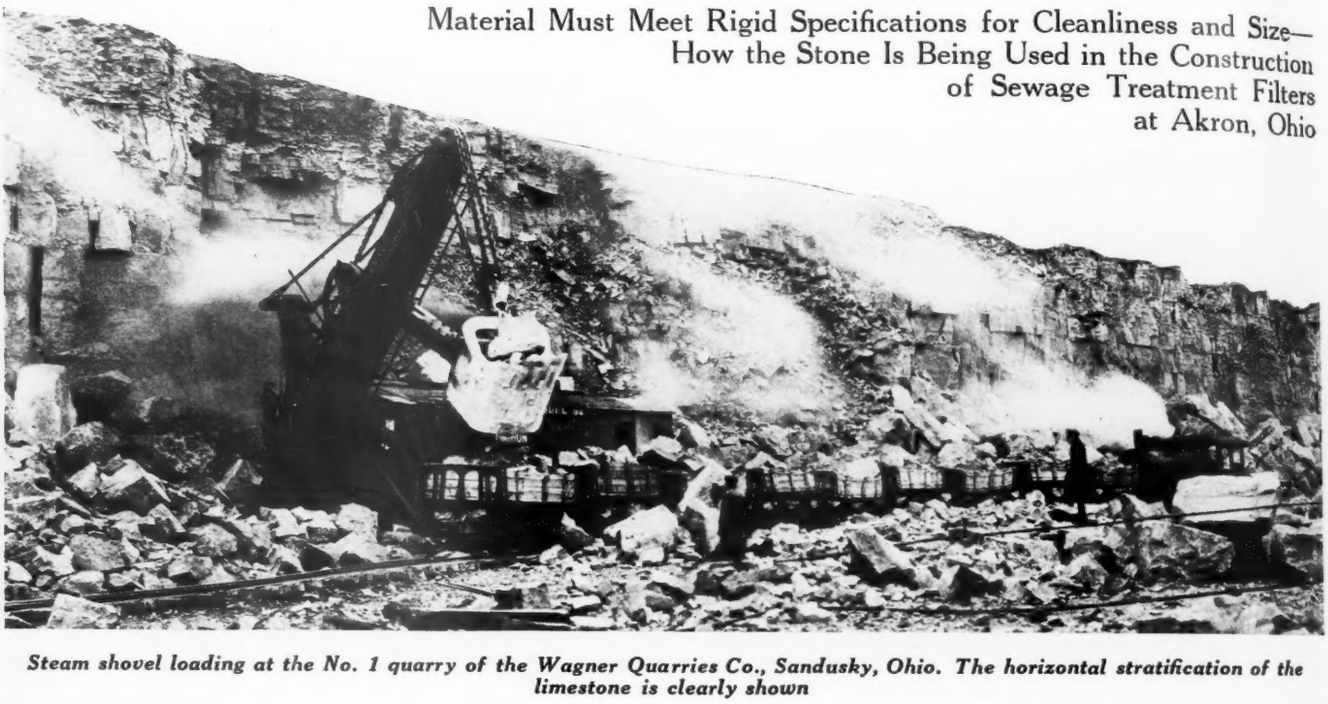


View of the company's modern plant business office and laboratory

Plant sign showing brand and trademark of the new product

Making Filter Stone at the Wagner Quarries Company Plant

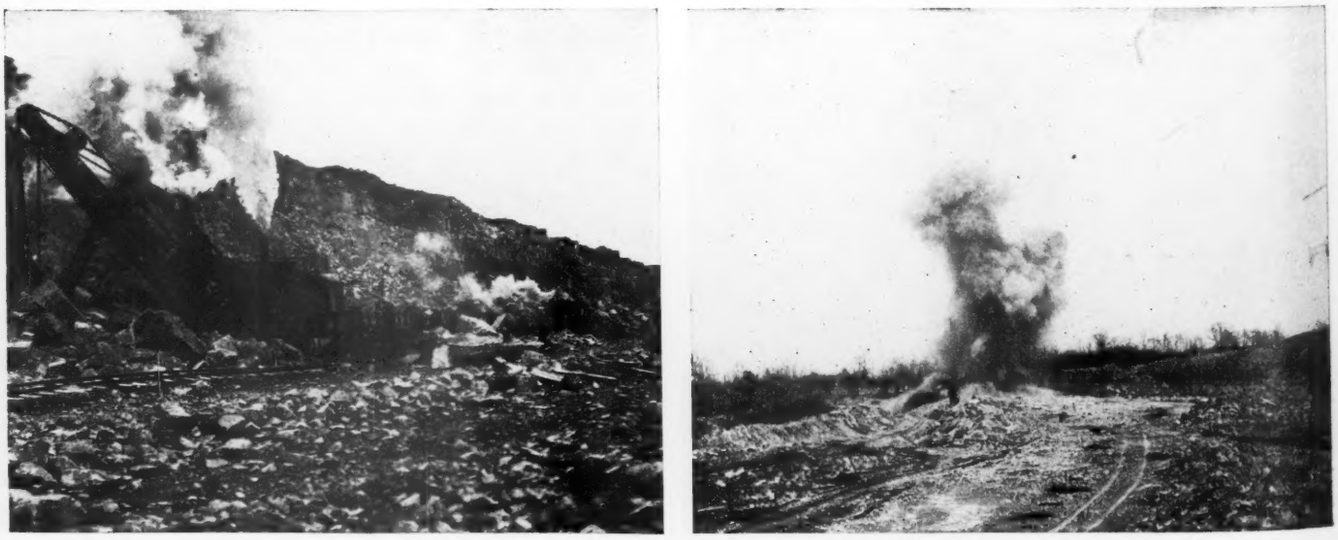
Material Must Meet Rigid Specifications for Cleanliness and Size—How the Stone Is Being Used in the Construction of Sewage Treatment Filters at Akron, Ohio



Steam shovel loading at the No. 1 quarry of the Wagner Quarries Co., Sandusky, Ohio. The horizontal stratification of the limestone is clearly shown

THE use of trickling filters for sewage purification is increasing throughout the United States. At the time this is written it is said that there are 21 such filters proposed and that practically all of them will be built during the coming year. Crushed stone, crushed gravel and crushed slag are the principal filter media and the size of such filters may be anything from a few square yards to the 30 acres which the Baltimore filter covers. So the market for rock products furnished by such filters is not inconsiderable. An average filter may require 300,000 tons of crushed material.

A filter now under construction at Akron, Ohio, attracted a great deal of attention in the crushed stone industry in the past year because the order for the 312,000 tons required to build it was rather a large one, and the rock was chosen under thoroughly competitive conditions and because it stood up under the severe tests to which it was subjected when all the competing materials were tested by an Eastern engineering firm. The order went to the Wagner Quarries Co., of Sandusky, Ohio. Since this order was taken the same firm has secured another order for 200,000 tons to be used in Cleveland. And there is a third large filter to be built in northern Ohio shortly which is expected to use the same rock, so this concern will specialize on filter stone production for some time to come.



Operations at the No. 1 quarry of the Wagner Quarries Co. showing the method of working

Not every quarry and not every plant can produce stone for trickling filters, for the operation of such a filter subjects the stone to about the severest weathering conditions that could be imagined. Stone kept under water and out of contact with the air will last almost indefinitely, provided there are no salts or acids in the water which will disintegrate it. And stone kept in air and without contact with water will last almost indefinitely, as many ancient structures in dry climates attest. But stone that is alternately wetted and dried (as it must be where fluids trickle over it) and subjected to the alternate freezing and thawing weather, which is common to all northern latitudes, must have remarkable qualities to stand up. Those who remember Mr. Stanley's paper read at the Detroit convention of the National Crushed Stone Association will recall that all stone filters have not stood up. A survey of filters using crushed limestone showed that a considerable proportion had deteriorated.

As to the plant, special precautions have to be taken with the screening, as the tolerances for oversize and undersize are small. The stone must pass rigid specifications for cleanliness and especially for freedom from dust, which explains why a special dust collecting system has been installed.

The No. 1 quarry of the Wagner Quarries Co. (it operates three quarries) is in the Columbus and Delaware formation which belongs to the lower rocks of the Devonian system. This formation is exposed in a somewhat narrow strip from Lake Erie almost straight south to a point about 30 miles south of Columbus. But it is not to be concluded that all of this formation, or even all the quarries in the same part of this formation, can produce filter stone. For tests have shown that many rocks which will make excellent aggregate, road material and ballast will not serve for filter stone, even though they come from the same geological formation as those which will make it.

Tractor mounted gasoline drill putting down holes

The country is flat and the strata lie horizontally. The quarry was opened in the way that is usual in that part of the country, by stripping the surface and working out an area with a face of sufficient height for drilling and for steam shovel loading. The face at No. 1 quarry is 35 ft. high, but the rock goes to considerable depth below so that other faces may be started on a lower level when the present area has been worked over. At present the quarry is about 4000 ft. long and 600 ft. wide.

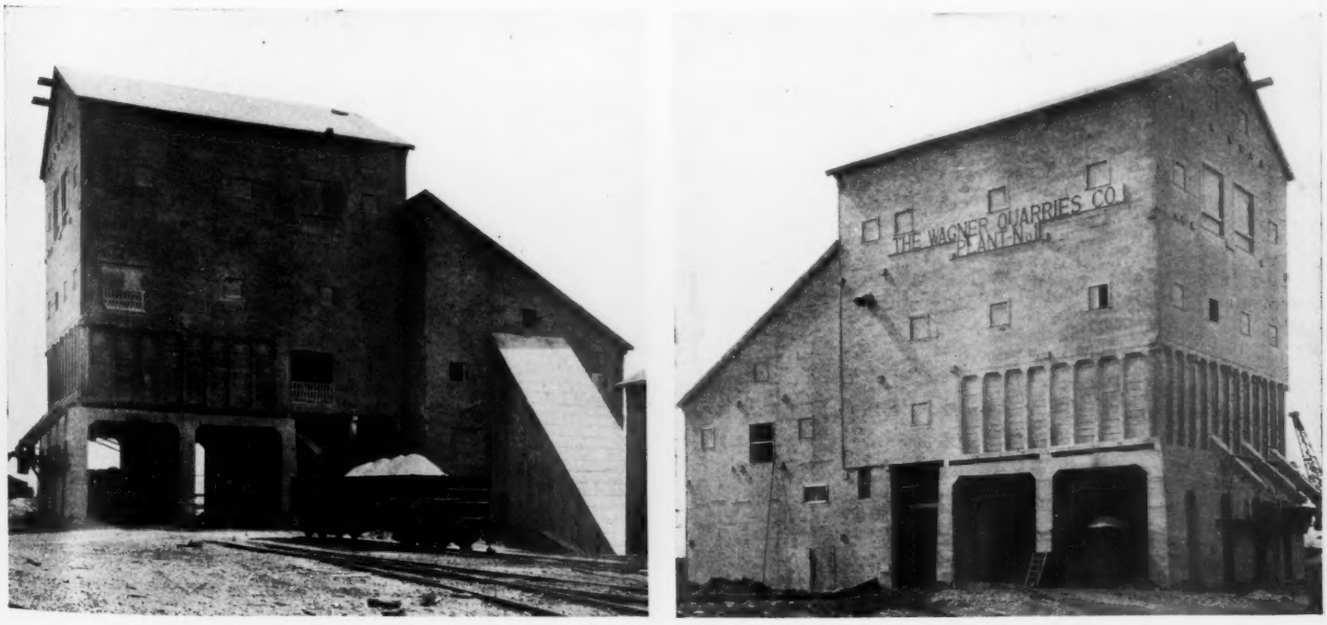
Since filter stone must be somewhat cleaner than stone for other uses, its preparation begins by carefully stripping the quarry. There is about 2 ft. of overburden to be removed on the average. This is dug by a Marion Model 92 steam shovel, and to make sure that all contaminating material is removed the shovel takes a layer of shelly rock, from 4 in. to 6 in. deep, which lies on top of the ledge. After this is cleaned off the top is almost as smooth as a cement sidewalk.

Holes are put down 10 ft. apart and 10 ft. back. Loomis clipper drills are used for this and two of these are of the recently designed tractor type with a four-cylinder gasoline engine for power. Five drills of Loomis make are used in the companies' quarries. The holes are 5½-in. in diameter and most of the load is placed at the bottom. Different kinds of powder are used, but if the hole is at all wet blasting geiatine is placed in the bottom. The strength of powder usually employed is 40% nitroglycerine.

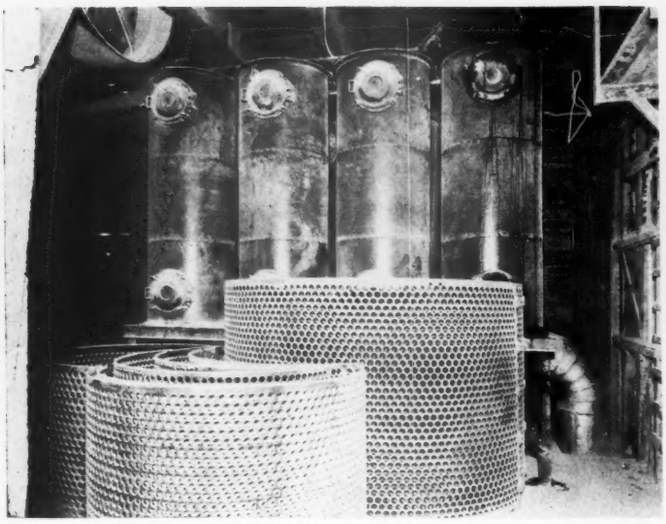
The rock fragments swell with this method and the stone is of good size to load with the 2½-yd. dipper of the Marion Model 92 steam shovel used. Five of these shovels are employed at the companies' quarries. The Koppel (8) cars employed are drawn to the plant by steam dinkies.

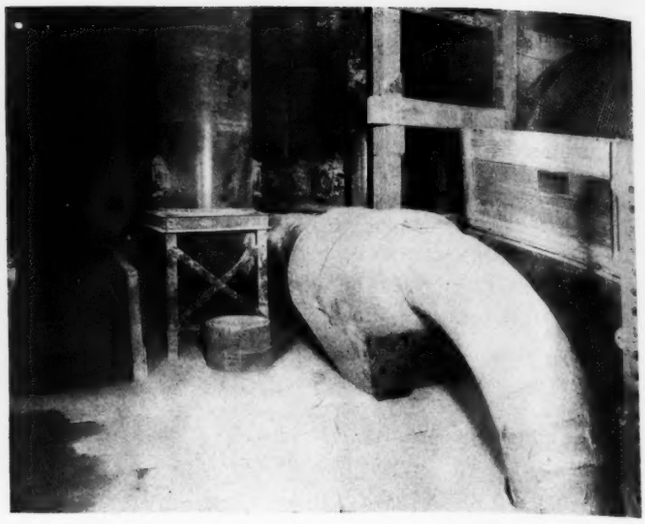
The plant was built by the Allis-Chalmers Manufacturing Co., which did the engineering as well as furnishing the machinery. The primary crusher, a No. 21, is in a separate house on the quarry floor and below the main building. Cars pass through this and dump directly to the crusher.

The discharge of the primary crusher goes



Side and front views of the No. 1 plant in which the specially made filter stone is prepared





Stone cleaning and dust collecting systems at the Wagner plant. The dust is sucked up by suction and deposited in the special bag collectors at the right

by a 42-in. pan conveyor to the screening and secondary crushing house. It first goes to a scalping screen 20 ft. long and 60 in. in diameter. This has 3-in., 4-in. and 6-in. perforations. The oversize, which will not pass a 6-in. hole, goes to a No. 8 crusher. The product through the 6-in. holes goes to two No. 6 crushers and the remainder goes to three No. 4 crushers. All three crushers are style K, Allis-Chalmers make.

The discharge of all the crushers goes to a 42-in. bucket and belt elevator which lifts it to two revolving screens 24 ft. long and 72 in. in diameter. These have 2½-in., 1¾-in. and 1½-in. perforations. The jacket has 1½-in. and 1-in. perforations. Holes of 1½-in. diameter are used in the jacket to prevent making an excess of fines.

The oversize of this screen is returned to the No. 3 and No. 4 crushers and the smaller sizes are sent either to bins or to two Allis-Chalmers shaking screens. These are 10 ft. long and 60 in. wide, and have ¼-in. square mesh wire cloth on a part of the screen and 5/8-in. round holes on the remainder. The oversize, all of which has passed the 1-in. holes of the revolving screen, is "three-quarter" material.

The filter stone must pass a 2½-in. hole and be retained on 1-in., but a 1% tolerance is permitted on the coarse end and a 5% tolerance on the fine end. As practical crushed stone men know, this is keeping screening within narrow limits. Five per cent is a very low tolerance for undersize and usually there is more than 1% of oversize, since the slightest wear on a screen, or even the "give" of an unworn screen, will allow some pieces, oversized by a small fraction, to be forced through the holes by pressure and centrifugal action. However, using only the ordinary precautions to secure good screening, the tolerance of 1% on the coarse side has so far been sufficient to permit all the product to pass.

To insure that the undersize is less than the 5% permitted, all filter stone is rescreened over a Hum-mer screen. This is really a double screen, or two screens in series, covered with 7/8-in. square mesh wire screening.

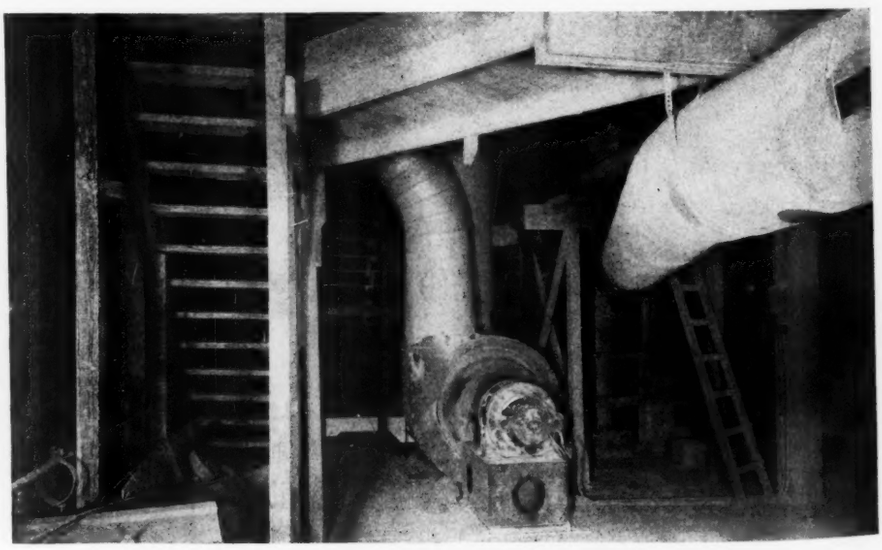
The specifications regarding cleanliness are rigid and it will be easy to see why they must be so when the construction of the filter is considered. Dust is especially objectionable. It is for this reason that in many cases where trickling filters have been built the engineers in charge have preferred to buy stone which had received no special preparation at the plant and then to rescreen and wash it on the job. But the Wagner Quarries Co. has arranged the plant so that the stone is not only sufficiently well screened but is also freed from dust before shipment.

Air-Cleaning Stone

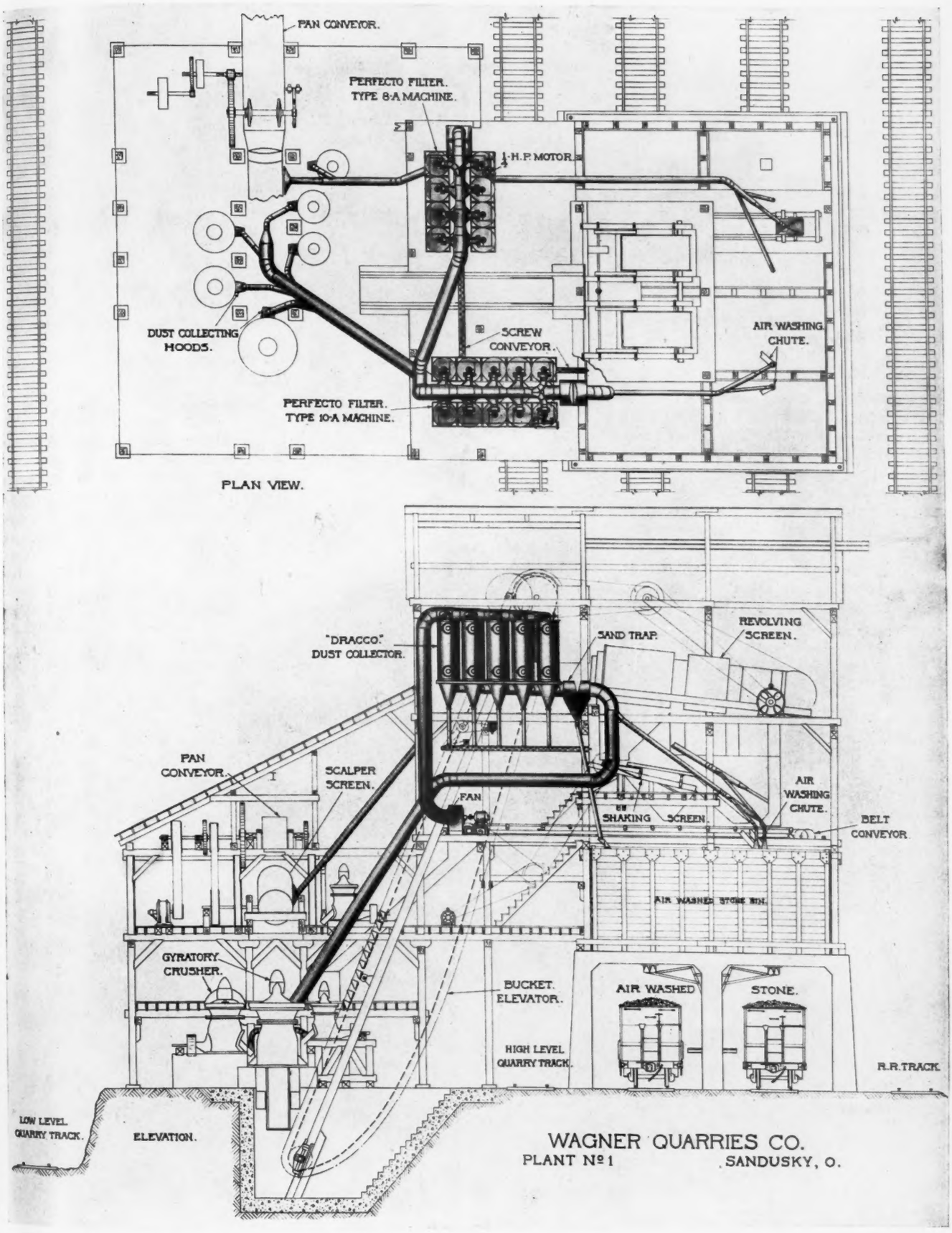
The system of cleaning and collecting the dust removed which has been installed in this plant is that of the Dust Recovery and Conveying Co., of Cleveland, Ohio. As has often been found to be the case, an installation made to insure cleanliness is also a source of profit. The dust recovered has a considerable market value because it comes from clean stone and it is found that from 50 to 60 tons are collected from the 4000 tons of rock that are crushed daily.

The system employs a fan which sucks up the dust and deposits it in a special form of bag collector. Connections to the suction pipe are made from all points where dust rises. These connections go to an opening in a chute through which the stone flows, the chute being given sufficient slope so that the pieces of stone fall over it without any danger of entering the connection to the suction. As they pass over this opening the air which is drawn in by the suction blows off any dust on the stone and also carries in any dust that may be in the air. When the system is working the air in the plant is practically dustless.

These openings are made in chutes from the crusher discharge and under the revolving and shaking screens. Pipes of smaller



Fan providing suction for the stone cleaning and dust collection system



Plan and elevation of the crushing and screening plant of the Wagner Quarries So., Sandusky, Ohio, especially drawn to illustrate essentials of the dust-removal, or "air-washing" process, and the dust collection

diameters lead to the large pipe that goes to the suction side of the fan, the diameters of pipes being figured according to the velocity of the air which it is desired to maintain in them.

The dust laden air goes into a manifold from which it is distributed to a number of bag collectors. These are steel plate cylinders containing 18 bags each of a fabric that acts as a filter. The dust clings to the bag and the air goes through to be discharged dust free. Bags are cleaned automatically by compressed air and a small motor-driven compressor is provided for this. The collected dust falls into conical portions at the lower ends of the collectors and goes from these into screw conveyors which take it to the dust bin.

All-Winter Operation

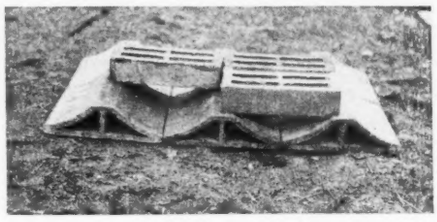
During the past winter work went on steadily at this quarry and plant and the stone was placed in stockpiles to be ready for delivery as the weather permitted its placing in the filter. Two Ohio Locomotive Co. cranes are kept busy loading and unloading at the stockpiles. Such other sizes as were made were stored for spring delivery to construction jobs. There is no accumulation of screenings, for these are sold to the Castalia Portland Cement Co. for cement raw material.

Thinking that the handling and placing of so large a quantity of crushed stone would be of interest to producers, one of the editors of Rock Products visited the sewage disposal plant about seven miles out of Akron. This is a thoroughly modern plant adapted to receive the sewage of a good sized city and discharge only water so purified from dangerous bacteria that it can be turned into the river without harm to anyone.

The disposal plant has required considerable material for aggregate as well as stone for filtering, for there is a large amount of concrete work in the walls and bottoms of tanks that cover several acres.

Details of Sewage Filters

The sewage after screening goes first to two circular tanks provided with skimming booms to remove grease and other floating material. Dirt settles out in these tanks to be removed occasionally by pumping. The overflow from these tanks goes to the square Imhoff tanks in which bacterial action begins the process of purification. From these it is pumped to a dosage basin and then to the sprinklers by which it is sprinkled all over the bed so that it trickles down through the stone. In the passage through the filter the instable organic compounds are oxidized to stable inorganic compounds.



Channel blocks with grill blocks in position

The basin which contains the filter stone is of concrete and is 800 ft. square. At the bottom A-shaped clay tile are placed, the spaces between them forming channels in which the purified sewage can run. These are covered with "grill-blocks" having slots 1 in. wide, which prevents the stone from falling into the channels. The stone is laid on these blocks.

Before the stone is laid a strip of paper is put into each channel under the grill-blocks so as to catch any dust, dirt or small pieces of stone that may fall through the slots. This paper is pulled forward as the work proceeds and any dirt or stone which is caught on the paper is removed. In this way the channels are kept clear. It is easy to see why filter stone has to be kept free from dust and dirt, as the slogging of these channels would seriously affect the flow through a trickling filter of this type.

The first course of stone laid down is larger than the regular filter stone, being all through 3¼-in. and remaining on a 2½-in. screen. This course is placed by hand, but the remainder for the 10-ft. of depth is placed by a conveyor system.

Placing the Stone

This system was furnished by the Jeffrey Manufacturing Co. and is of a type familiar to producers, as it is the same that is used to spread stone in plant bins. The stone is brought to the work in hopper bottom gondola cars that are unloaded into a hopper under the track. A carrier of the pivoted bucket type takes the stone from the hopper and lifts it to where it can fall on a shuttle conveyor 400 ft. long. This conveyor is on a steel frame mounted on rails so that conveyor and frame can be pushed forward as the work proceeds.

The shuttle conveyor discharges on a conveyor at right angles, running across the basin. This conveyor is provided with a motor-operated tripper which moves back and forth the length of the belt, discharging the stone evenly all the way. When the stone is deposited the full depth of the bed the whole conveyor with its supporting frame is moved forward. To permit this the frame is supported on trucks that run on tracks that are laid on the filter bed as the work proceeds. As an 800-ft. frame would be long to handle, two 400-ft. frames and belts are used.

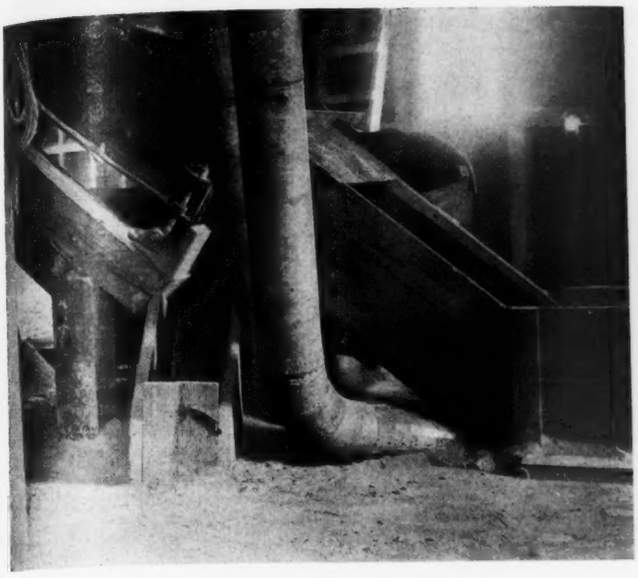
Good sized stockpiles are maintained on the job for both filter stone and the gravel sand and stone that are used as concrete aggregates.

All stone for the filter bed is inspected at the plant as it is loaded on the cars.

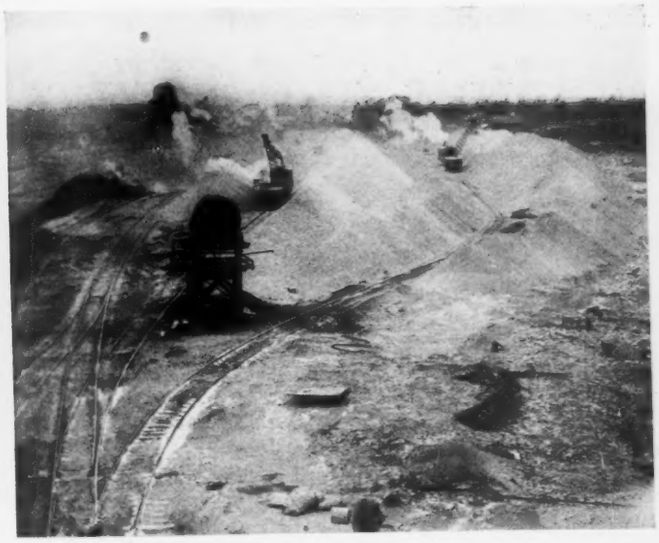
The offices of the Wagner Quarries Co. are in the Commercial Bank Bldg., Sandusky, Ohio. Its three plants have a daily capacity of 15,000 tons. W. J. Sprow is secretary and general manager. Fred Zeck is general superintendent.

Concrete basin for filter stone

Position of dosage basin showing depth of filter



Connections from chute under vibrating screen to dust recovery system



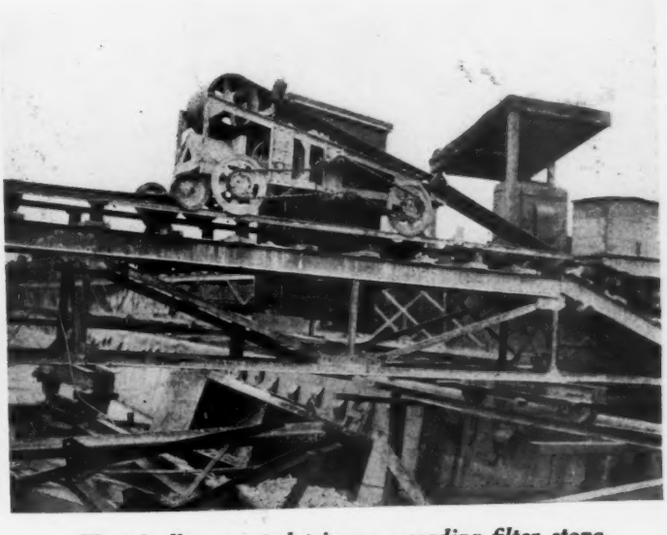
Stock piles of filter stone at the Wagner quarry. This picture was taken during the winter months and shows how shipments were taken care of continuously

Pictures Below Illustrate the Handling and Use of the Crushed Stone at the Akron Filter Plant

Concrete "detrius" tanks at disposal plant

Forms for concrete tanks at sewage disposal plant

Track hopper, carrier and shuttle conveyor for placing filter stone



Electrically operated tripper spreading filter stone uniformly

Hints and Helps for Superintendents

Increasing Life of Dredge Cutter Teeth

By A. V. HARRIS
District Sales Manager, Haynes Stellite Co., New York

IN order to further the life of the tooth of a suction dredge cutter stellite was advocated and applied to the inside and outside faces of a steel casting cutter.

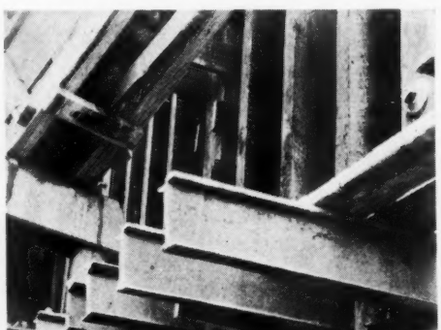
The casting was a very rough sand casting and had been painted, no machining or grinding having been done on the surface which was to receive the stellite, which impeded the stelliting process considerably. The casting was about 4 ft. high and 4 ft. long, resembling a crown with six cutter blades about 12 in. wide, starting at the bottom ring on a slight twist and then rising about 3 ft., still continuing the twist and then curving over and termining in a heavy square cast section in center. Each cutter blade makes about one-half complete turn through its distance. Each blade at cutting edge varied in thickness from ⅛ to ½ in., increasing in thicknes through depth to about 1 in. thick. The weight was about 3500 lb.

Stellite was applied about 3/16 to ¼ in. in thickness overall to each blade inside and outside surfaces subject to wear or a distance of about 30 in. on each blade on outside and inside. The job, as can be seen from the pictures, was very difficult to handle. However, it was successfully done at the Oxweld-Acetylene Co.'s plant in Newark, N. J.

In all 150 lb. of stellite were used, taking about 105 hours to accomplish the job. Twelve cylinders or 2640 ft. of oxygen were used. The acetylene was supplied from a generator and no record was kept of the amount used. The oxygen, acetylene and stellite welding plus the cost of casting totaled in the neighborhood of $1700 for the entire work done.

The finished cutter in question was then forwarded to the Raymond Concrete Pile Co. for dredging at Maracaibo, Venezuela, and we have received information from them under date of March 17, advising that the stellite cutter has been in constant use since December 11 and at the present time 192,000 yd. have been cut and they believe it will still cut another 100,000 yd. Original steel casting cutters gave aproximately six weeks' use or 80,000 yd.

The original cost of the cutter was about $800 and it lasted about 6 weeks in certain water, due to the abrasive action of the sand. Outside of the cost which would accrue from shutting down work to replace or repair the cutter, the savings in cost of material gained through the use of the stellited cutter are said to be about two to one or about $1200.



Old street car rails used to repair a kiln bottom

Repairing a Bin Bottom with Old Street Car Rails

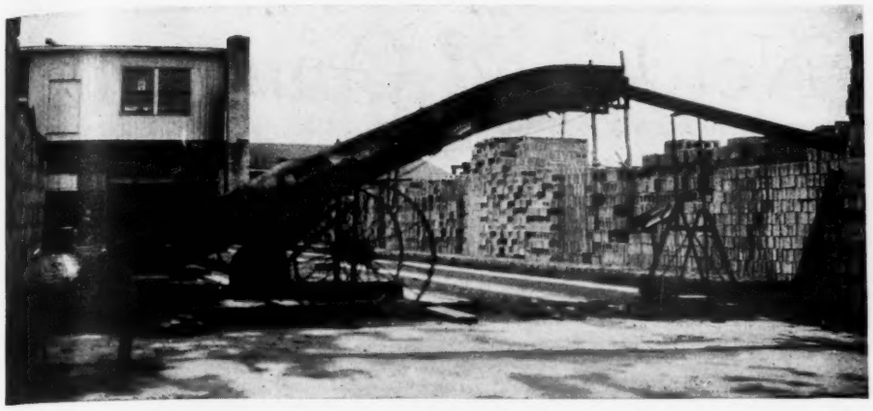
THE bins of the Dixie Sand and Gravel Co.'s plant at Petersburg, Va., are of timber on concrete walls. The beams supporting the bottom of the bin were originally of wood. After these had been in use for between two and three years it was noted they were failing, owing to the effect of the water from the gravel and sand which ran down over them.

J. H. Mallory, Jr., the plant superintendent, in looking about for a way to repair these beams, found some old street car rails which were to be sold as junk. He bought enough of them to serve the purpose and substituted them for the wooden beams. The work was done by driving the rails through while the wooden beams were in place and then taking out the wooden beams.

When the work was done the plant had a support of steel beams that will last indefinitely. The work was done at odd times and the plant was not shut down at any time in order to make the change.

David Alexander, prominent in the National Sand and Gravel Association, is the general manager of the Dixie company.

Strips of special alloy welded to the inside and outside faces of a rotory dredge cutter to increase the life of the teeth



Portable conveyor for moving and piling concrete tile

Portable Conveyor for Moving Concrete Tile

MOVING concrete block and tile after they have been made is an expense that every block and tile manufacturer would be glad to lessen as much as possible. This shows the method adopted in the "stonetile" plant of the Dixie Concrete Products Co. of Chattanooga, Tenn.

The device is a simple portable conveyor of a special type on which the finished tile may be placed. This lifts them to where they can run on a gravity conveyor to the place where they are to be piled.

Although this conveyor is adapted to the special needs of a "stonetile" plant, there would seem to be no reason why conveyors of the portable type should not be used with ordinary block and tile more often than they are. This was one of the suggestions made for improved plant design in a paper read at the American Concrete Institute meeting. Gravity conveyors are used in some plants where cinder block are made.

Progress in mechanical handling of cement products, especially the green products, is one of the problems before the industry.

Keeping Bearing Bolts in Place

THE recesses for the bolt heads on large bearing boxes, of the straight or angle type, are often cored to a height that will allow the use of short bolts. On removal of the cap, the bolts drop down to the sole plate and have to be "fished" out with a wire or string when the cap is replaced. The "fishing" at the best is always a tedious and uncertain operation. Wedging the bolts in the bolt holes is not always successful either, for they may be either out of line or driven back accidentally. A better plan to accomplish this purpose is described by Charles Labbe, Clarkdale, Ariz., in a recent issue of *Engineering and Mining Journal.*

The method, illustrated below, consists of fitting wood blocks in the recesses under the bolt holes before putting the bearing in place. These will hold the bolts firmly in place and keep them from turning in case the nut does not screw easily.

Unusual Water Supply for a Crushing Plant

THE Chickamauga Quarry and Construction Co. of Chattanooga, Tenn., operates a quarry which is on Chickamauga creek about 30 miles from the city. The plant is steam driven and needs water for the boilers and for cooling the compressor which supplies air to the drills. The greater part

Storage tank into which the hydraulic ram pumps

of the water needed is drawn from the creek which is about 50 ft. below the plant and pumped to the plant by a hydraulic ram.

The hydraulic ram is a very old device for raising water, which is said to have been invented by the same French genius who invented the balloon. By a system of valves and a pressure chamber, a large quantity of water operating under a low head is made to raise a smaller quantity of water through a high head. About its only general use today is in supplying isolated homes with water, where a nearby creek gives the necessary fall.

The water raised by the ram would hardly be sufficient for all the needs of the plant without some storage. This is provided in a steel tank set above the boilers and near the plant. The ram keeps this full and any excess water runs out of an overflow pipe at the top.

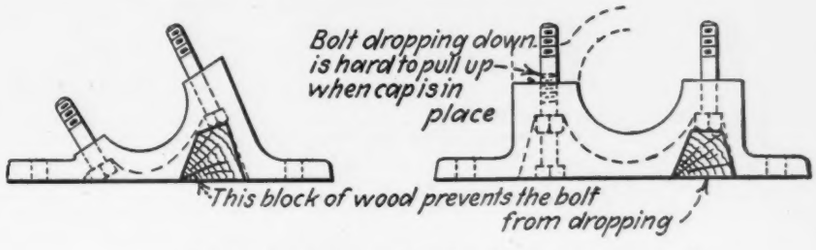
Hydraulic ram in its box by the creek

The ram runs continuously and had run for something like two years when the plant was visited. If it is kept running it does not freeze up in the coldest weather which comes to that part of Tennessee. It requires no more attention than a covered box placed beside the stream.

To give the required pressure to operate the ram, a dam about 3 ft. high was placed in the creek and a 4-in. pipe taken out to carry the water to the ram, which is about 100 ft. below. As the fall of the creek is rapid at this point, an operating head of 8 or 10 ft. is secured in this way.

In case more water is needed than the ram will supply, a steam pump placed close to the creek is started. But by far the greater part of the water needed is supplied by the ram with no cost except that of installation.

The ram is a machine which may be bought from pump manufacturers, so the only novelty in connection with this installation is its use in supplying water to a crushing plant. It is perhaps a unique installation in that respect.



Device for keeping bearing bolts in place

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

(These are the most recent quotations available at this printing. Revisions, corrections and supplemental information will be welcomed by the editor.)

Stock	Date	Par	Price bid	Price asked	Dividend rate
Allentown Portland Cement Co. (common)[32]	May 10	.....	1½	3	
Allentown Portland Cement Co. (6% bonds, 1932)[32]	May 10	.....	87	92	
Alpha Portland Cement Co. (common)[2] new stock	May 10	No par	40	43	37½c quar. Apr. 15
Alpha Portland Cement Co. (preferred)[2]	May 10	100	115	.....	1¾% quar. Mar. 1
American Lime and Stone Co. (7% bonds, 1942)[32]	May 10	.....	97	101	
Arundel Corporation (sand and gravel—new stock)	May 11	No par	35⅜	36	50c April 1
Atlantic Gypsum Products Corp. (1st 6's carrying 10 sh. com.)[10]	May 11	.....	116	120	
Atlas Portland Cement Co. (common)[2]	May 10	No par	41½	43½	50c qu. March 1
Atlas Portland Cement Co. (preferred)	.....	100	.....	.....	2% quar. Oct. 1
Atlas Portland Cement Co. (preferred)[2]	May 10	33⅓	43	.....	2% quar. Apr. 1
Beaver Portland Cement Co. (1st Mort. 7's)[3]	July 29	100	100	100	
Bessemer Limestone and Cement Co. (Class A)[4]	Apr. 8	.....	34	34¾	75c quar. May 1
Bessemer Limestone and Cement Co. (6½% bonds)[4]	Apr. 8	.....	99	100	
Boston Sand and Gravel Co. (common)	May 7	100	70	.....	1% qu., 2% ex. Jan. 1
Boston Sand and Gravel Co. (preferred)	May 7	.....	.....	85	1¾% quar. Jan. 1
Boston Sand and Gravel Co. (1st preferred)	May 7	.....	.....	90	2% quar. Jan. 1
Canada Cement Co., Ltd. (common)	May 11	100	151	151½	1¾% April 16
Canada Cement Co., Ltd. (preferred)[11]	May 11	100	119	.....	1¾% quar. May 16
Canada Cement Co., Ltd. (1st 6's, 1929)[11]	May 11	.....	101¼	102½	3% semi-annual A&O
Canada Crushed Stone Corp., Ltd. (6½s, 1944)[11]	May 11	100	95	99	
Charles Warner Co. (lime, crushed stone, sand and gravel)	May 11	No par	24	.....	50c Apr. 11
Charles Warner Co. (preferred)	May 11	100	103	.....	1¾% quar. Apr. 28
Charles Warner Co. (lime, crushed stone, sand and gravel) 7s, 1929[16]	May 7	100	102	103½	
Cleveland Stone Co. (new stock)	May 11	.....	49	49	50c qu. June 15
Connecticut Quarries Co. (1st Mortgage 7% bonds)[17]	May 7	100	105	.....	
Consolidated Cement Corp. (1st Mort., 6½s, series A)[24]	May 11	100	97	99	
Consolidated Cement Corp. (5 yr. 6½% gold notes)[24]	May 11	100	96	100	
Consumers Rock and Gravel Co. (1st Mort. 7s)[18]	May 6	100	99½	101½	
Coosa Portland Cement Co. (6% bonds, 1944)[32]	May 10	.....	70	.....	
Coplay Portland Cement Co. (6% bonds, 1941)[23]	May 10	.....	88	.....	
Dewey Portland Cement Co. (1st mort. 6's 1942)[30]	May 11	100	99	101	
Dolese and Shepard Co. (crushed stone)[7]	May 11	50	96	99	$1.50 Jan. 1, $1.50 ex. Jan. 1
Egyptian Portland Cement Co. 7% pfd.[21]	May 8	.....	85	95	1¾% quar. Oct. 1
Egyptian Portland Cement Co. (common)[21]	May 8	.....	5	7	40c quar. Oct. 1
Fredonia Portland Cement Co. (6½% bonds, 1940)[32]	May 10	.....	97	101	
Giant Portland Cement Co. (common)[2]	May 10	50	55	62	
Giant Portland Cement Co. (preferred)[25]	May 10	50	40	50	3½% and 19% ex. Dec. 15
Ideal Cement Co. (common)	May 11	No par	82	84	$1 quar., $1 ex. Dec. 15
Ideal Cement Co. (preferred)[33]	May 9	100	112½	113½	1¾% quar. Dec. 15
International Cement Corporation (common)	May 11	No par	53	53¾	$1 quar. Mar. 31
International Cement Corporation (preferred)[2]	May 9	100	108¾	109½	1¾% quar. Mar. 31
Kelley Island Lime and Transport Co.	May 11	100	135	137	$2 quar. April 1
Lawrence Portland Cement Co.[2]	Apr. 25	100	100	103	2% quar.
Lehigh Portland Cement Co.[6]	May 10	50	115	117	1½% quar.
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, 1928 to 1931)[13]	May 7	100	98	100	
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, 1932 to 1935)[13]	May 7	100	96½	99	
Marblehead Lime Co. (1st Mort. 7's)[14]	May 7	100	100	.....	
Marblehead Lime Co. (5½% notes)[14]	May 7	100	98	.....	
Michigan Limestone and Chemical Co. (common)[6]	May 10	.....	26	28	
Michigan Limestone and Chemical Co. (preferred)[6]	May 10	.....	24	26	1¾% quar. July 15
Missouri Portland Cement Co.	May 11	25	44	45	50c May 1
Monolith Portland Cement Co. (common)[9]	May 6	.....	12½	12¾	8% ann. Jan. 2
Monolith Portland Cement Co. (units)[9]	May 6	.....	31½	32¼	
Monolith Portland Cement Co. (preferred)[9]	May 6	.....	9½	9¾	
National Gypsum Co. (common)[35]	May 11	.....	47½	48½	
National Gypsum Co. (preferred)[35]	May 11	.....	81	83	
Nazareth Cement Co.[20]	May 7	No par	30	32	75c quar. Apr. 1
Newaygo Portland Cement Co.[1]	May 10	.....	110	115	
Newaygo Portland Cement Co. (6½% bonds, 1938)[22]	Apr. 26	.....	100	102	
New England Lime Co. (Series A, preferred)[14]	May 7	100	95	.....	
New England Lime Co. (Series B, preferred)[22]	Apr. 25	100	95	97	
New England Lime Co. (V.T.C.)[22]	Apr. 25	.....	33	36	
New England Lime Co. (6s, 1935)[14]	May 7	100	99	101	
New York Trap Rock Corp. (6% bonds, 1946)[32]	May 10	.....	97⅝	98	
North American Cement Corp. 6½s 1940 (with warrants)	May 11	100	92⅜	92⅜	
North American Cement Corp. (units of 1 sh. pfd. plus ½ sh. common)[32]	Apr. 26	.....	62	67	2 mo. period at rate of 7%
North American Cement Corp. (common)[19]	Apr. 9	.....	8⅛	9	
North American Cement Corp. (preferred)	Apr. 25	.....	.....	.....	1.75 quar. May 2
North Shore Material Co. (1st Mort. 6's)[15]	May 11	100	98⅞	99½	
Pacific Portland Cement Co., Consolidated[5]	May 7	100	61¾	74	25c mo.
Pacific Portland Cement Co., Consolidated (secured serial gold notes)[5]	May 7	100	97½	.....	3% semi-annual Oct. 15
Peerless Portland Cement Co.[1]	May 10	10	5	5⅜	
Pennsylvania-Dixie Cement Corp. (1st Mort. 6's)[29]	May 11	100	100	100	
Pennsylvania-Dixie Cement Corp. (preferred)[29]	May 10	100	99⅛	99⅛	1¾% March 15
Pennsylvania-Dixie Cement Corp. (common)[29]	May 11	.....	37⅛	38¼	80c April 1
Petoskey Portland Cement Co.[1]	May 11	10	10	10½	1½% quar.
Pittsfield Lime and Stone Co.[31]	Apr. 26	.....	.....	100	
Pittsfield Lime and Stone Co.[31] (common)	Feb. 25	.....	.....	25	

(CONTINUED ON PAGE 86)

[1]Quotations by Watling, Lerchen & Hayes Co., Detroit, Mich. [2]Quotations by Bristol & Willett, New York. [3]Quotations by True, Webber & Co., Chicago. [4]Quotations by Butler, Beading & Co., Youngstown, Ohio. [5]Quotations by Freeman, Smith & Camp Co., San Francisco, Calif. [6]Quotations by Frederic H. Hatch & Co., New York. [7]Quotations by F. M. Zeiler & Co., Chicago, Ill. [8]Quotations by Ralph Schneeloch Co., Portland, Ore. [9]Quotations by A. E. White Co., San Francisco, Calif. [10]Quotations by Lee, Higginson & Co., Boston and Chicago. [11]Nesbitt, Thomson & Co., Montreal, Canada. [12]E. B. Merritt & Co., Inc., Bridgeport, Conn. [13]Peters Trust Co., Omaha, Neb. [14]Second Ward Securities Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois, Chicago. [16]J. S. Wilson Jr. Co., Baltimore, Md. [17]Chas. W. Scranton & Co., New Haven, Conn. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hemphill, Noyes & Co., New York. [20]Quotations by Bond & Goodwin & Tucker, Inc., San Francisco. [21]Baker, Simonds & Co., Inc., New York. [22]William C. Simons, Inc., Springfield, Mass. [23]Blair & Co., New York and Chicago. [24]A. B. Leach and Co., Inc., Chicago. [25]A. C. Richards & Co., Philadelphia, Penn. [26]Hincks Bros. & Co., Bridgeport, Conn. [27]J. G. White and Co., New York. [28]Mitchell-Hutchins Co., Chicago, Ill. [29]National City Co., Chicago, Ill. [30]Chicago Trust Co., Chicago. [31]McIntyre & Co., New York, N. Y. [32]Hepburn & Co., New York. [33]Boettcher & Co., Denver, Colo. [34]Kidder, Peabody & Co., Boston, Mass. [35]Farnum, Winter and Co., Chicago.

Editorial Comment

Long Distance Sand and Gravel Traffic

So far as we know now, a little, insignificant news item in the *Tampa* (Fla.) *Tribune* of April 30, gives the record long distance transportation for a cargo of gravel—from Baltimore, Md., to Tampa, Fla., a distance by water of at least 1500 miles. The item refers to casually mentions the unloading of a gravel cargo from the steamer "Catherine Weems" and the taking on of a cargo of phosphate. Baltimore is a great sand and gravel producing center, a fertilizer manufacturing center, hence a phosphate-consuming center.

We presume this is by no means the first cargo of gravel from Baltimore landed at Tampa, or some other Florida port. We know that trap-rock shipments have been made from New York to Florida for several years. Nevertheless, it is an interesting commentary on the economic importance of such a once-despised commodity as ordinary gravel.

Legitimate Pooling of Sales Efforts

Wisconsin has always had the reputation of being twenty years or more in advance of the rest of the country in constructive legislation, or radical legislation, whichever way one cares to view it. The late Senator La Follette, the pioneer "Progressive," used to point with pride to the fact that ideas and legislation originating in Wisconsin later were incorporated in the "progressive" policies of the nation. Elsewhere in this issue is a description of an organization of limestone producers operating under a bit of progressive legislation in Wisconsin, which is said to be more radical than its originators had in mind when it was submitted to the legislature for adoption.

For Wisconsin, if our memory is correct, is the original "trust-busting" state; and the legislation referred to specifically authorizes pooling of sales efforts, fixing of prices, etc., with a penalty provided for violation of such agreements entered into between producers! The law was intended to provide for agricultural cooperatives, which are recognized both by many state laws, and by federal law, as exempt from the operation of certain features of the more general anti-trust laws. As it ultimately got on the statute books the Wisconsin law was so worded as to give the producers of agricultural lime, limestone and other agricultural necessities the same opportunities for cooperative selling as the farmers were to enjoy under its provisions.

To a fair-minded person this would seem only poetic justice, unless we are ready to assume that the farmer, because of peculiar innate integrity (or because of lack of business shrewdness) would be incapable of organizing and operating a *pernicious* monopoly; while the ordinary commodity producer couldn't be trusted. This law has now been in effect in Wisconsin for two years (between legislative sessions), and business men in many lines have taken advantage of it. If some of these have abused their rights and privileges under the law no doubt the legislature, which is now in session, will repeal or amend it to correct such abuses.

Since the Sherman anti-trust law and similar state laws were adopted there has been a great change for the better in business ethics and in the attitude of business men and producers toward the consuming public. It would be pleasing to believe that this change is so great, and the new standards so well established, that competitors in all lines of business may work together harmoniously and legitimately for the public welfare, as well as for their own selfish best interests, in some such way as the agricultural limestone producers of Wisconsin are cooperating.

The great danger is that industries, under such laws, are all in one unit; and abuse by one small group in that unit will probably quickly deprive the whole of their great opportunity. Perhaps it is too much to expect *yet* that *business as a whole,* given license and opportunity to gouge the public, will be able to resist that temptation. But if trade associations continue in ascendency and develop along lines that will be of the greatest *ultimate* value to their members and their industries, they may become the instruments by which business is sufficiently educated in ethics and morality to be trusted to operate under such laws as that in Wisconsin, to the very probable benefit of our states and citizens, including the owners of business, which, of course, in the last analysis is *everybody.*

It *is* pleasing to contemplate that a rock products industry is one of the first, if not *the* first, to demonstrate that such combinations as have hitherto been taboo as against public welfare can actually be proved to be the contrary. We trust the experiment will be continued and that producers will fully appreciate their obligations.

YOUR editorial in the April 16 issue of Rock Products has just been placed before me, and I want to thank you for the unbiased and constructive thoughts you have embodied in it. It is publications of this kind that give one courage to fight for what is right.

On behalf of our company, as well as the industry I am serving, I sincerely thank you.

H. STRUCKMANN,
President, International Cement Corp.

New York City, April 23, 1927.

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS (Continued)

Stock	Date	Par	Price Bid	Price Asked	Dividend Rate
Riverside Portland Cement Co.	May 9	.....	165	.....	
Rockland and Rockport Lime Corp. (1st preferred)[34]	May 9	100	103	.....	3½% semi-annual Feb. 1
Rockland and Rockport Lime Corp. (2nd preferred)[34]	May 9	100	60	.....	3% semi-annual Feb. 1
Rockland and Rockport Lime Corp. (common)[34]	May 9	No par	50	55	1½% quar. Nov. 2
Sandusky Cement Co. (common)[1]	May 11	100	125	135	$2 qu. April 1
Santa Cruz Portland Cement Co. (bonds)[8]	May 7	.....	106	107	6% annual
Santa Cruz Portland Cement Co. (common)[8]	May 7	.....	85	.....	$1 quar., $1 ex. Jan. 1
Schumacher Wallboard Corp. (common)	Mar. 26	.....	27¼	27¾	
Schumacher Wallboard Corp. (preferred)	Mar. 26	.....	27¾	.....	
Southwestern Portland Cement Co. (units)	May 11	.....	205	.....	
Superior Portland Cement, Inc. (Class A)[30]	May 6	.....	43	44¼	
Superior Portland Cement, Inc. (Class B)[30]	May 6	.....	21½	22	
United Fuel and Supply Co. (sand and gravel) 1st Mort. 6s[27]	May 7	100	98	100	
United Fuel and Supply Co. (sand and gravel) 6% gold notes[27]	May 7	100	98	100	
United States Gypsum Co. (common)	May 11	20	98	99	40c quar. June 30
United States Gypsum Co. (preferred)	May 11	100	120	.....	1¾% quar. June 30
Universal Gypsum Co. (common)[3]	May 11	No par	9	9½	
Universal Gypsum V.T.C.[3]	May 11	No par	8½	9	
Universal Gypsum Co. (preferred)[3]	Nov. 23	.....	73	77	1½% Feb. 15
Universal Gypsum and Lime Co. (1st 6's, 1946)[3]	May 11	100	.....	96	
Union Rock Co. (7% serial gold bonds)[18]	May 11	.....	99	101	
Upper Hudson Stone Co. (1st 6's, 1951)[32]	May 10	.....	93	.....	
Upper Hudson Stone Co. (1st 6's, 1937)[33]	May 10	.....	104	.....	
Vulcanite Portland Cement Co. (7½% bonds, 1943)[32]	May 10	100	98½	101	
Wisconsin Lime and Cement Co. (1st Mort. 6s, 1940)[15]	May 11	100	99	.....	
Wolverine Portland Cement Co.	May 11	10	5⅛	5½	15c quar. May 16
Yosemite Portland Cement Co.	May 11	.....	7½	.....	

QUOTATIONS OF INACTIVE ROCK PRODUCTS SECURITIES

Stock	Date	Par	Price bid	Price asked	Dividend rate
Atlanta Shope Brick and Tile Co.[1]	Nov. 24	.....	25c	.....	
Benedict Stone Corp. (cast-stone) (50 sh. pfd. and 390 sh. com.)[1]	Dec. 29	.....	$400 for the lot	.....	
Blue Stone Quarry (60 shares)[2]	Mar. 16	.....	$10¼ for the lot	.....	
Coplay Cement Mfg. Co. (common) (4)	Dec. 16	.....	12½	.....	
Coplay Cement Mfg. Co. (preferred) (4)	Dec. 30	.....	70	.....	
Eastern Brick Corp. 7% cu. pfd.) (1)	Dec. 9	10	40c	.....	
Eastern Brick Corp. (sand lime brick) (common) (1)	Dec. 9	10	40c	.....	
Edison Portland Cement Co. (common)[4]	Sept. 11	50	20c	.....	
Edison Portland Cement Co. (preferred)	Nov. 3	50	17½c(x)	.....	
International Portland Cement Co., Ltd. (preferred)	Mar. 1	.....	30	45	
Globe Phospate Co. ($10,000 1st mtg. bonds, $169.80 per $1000 paid on prin.)	Dec. 22	.....	$50 for the lot	.....	
Iroquois Sand & Gravel Co., Ltd. (2 sh. com. and 3 sh. pfd.) (1)	Mar. 17	.....	$12 for the lot	.....	
Limestone Products Corp. (150 sh. pfd., $50 par, and 150 sh. com., no par)	Dec. 22	.....	$60 for the lot	.....	
Missouri Portland Cement Co. (serial bonds)	Dec. 31	.....	104¾	104¾	3¼% semi-annual
Olympic Portland Cement Co. (g)	Oct. 13	.....	.....	£1⅗	
Phosphate Mining Co. (1)	Nov. 24	.....	1	.....	
River Feldspar and Milling Co. (50 sh. com. and 50 sh. pfd.) (1)	June 23	.....	$200 for the lot		
Rockport Granite Co. (1st 6's, 1934)[2]	Aug. 31	.....	90	.....	
Simbroco Stone Co.[2]	Apr. 20	.....	12	12	
Southern Phosphate Corp.[6]	Sept. 15	.....	1¼	.....	
Tidewater Portland Cement Co. (3000 sh. com.)	Dec. 22	.....	$6525 for the lot	.....	
Vermont Milling Products Co. (slate granules) 22 sh. com. and 12 sh. pfd. (5)	Nov. 3	.....	$1 for the lot	.....	
Wabash Portland Cement Co.[1]	Aug. 3	50	60	100	
Winchester Brick Co. (preferred) (sand lime brick) (5)	Dec. 16	.....	10c	.....	

(g) Neidecker and Co., Ltd., London, England. (1) Price obtained at auction by Adrian H. Muller & Sons, New York. (2) Price obtained at auction by R. L. Day and Co., Boston. (3) Price obtained at auction by Weilepp-Bruton and Co., Baltimore, Md. (4) Price obtained at auction by Barnes and Lofland, Philadelphia, Pa. (5) Price obtained at auction for lot of 50 shares by R. L. Day and Co., Boston, Mass. (x) Price obtained at auction by Barnes and Lofland, Philadelphia, on November 3, 1925. (6) Price obtained at auction by Wise, Hobbs and Arnold, Boston, Mass.

Consumers Material Corporation Bonds Offered

W. R. COMPTON AND CO., Chicago, Ill., are offering at 98½, $550,000 first mortgage 6½% sinking fund gold bonds (closed mortgage) of the Consumers Material Corp., Kansas City, Mo. Dated April 1, 1927. Due April 1, 1937. Redeemable as a whole or in part by lot on any interest date on 30 days notice at 105 and accrued interest to April 1, 1932, and thereafter at a price of 1% lower each year or part thereof to maturity.

The following data are from a letter by R. Newton McDowell, president of the Consumers Material Corp.:

Business and Properties—The Consumers Material Corp., organized under the laws of Delaware, will acquire all the physical properties and assets of the following companies:

American Rock Crusher Co., Inc.—three plants; Atlas Crushed Rock Co.—one plant; Clay County Crushed Rock Co.—one plant; Consolidated Crushed Stone Corp.—two plants; Kansas City Quarries Co.—three plants; W. M. Spencer Co.—two plants; W. A. Ross Construction Co. (quarry only)—one plant; Thomson Bros. Rock Co.—two plants; Twyman Crushed Rock Co.—one plant.

The properties owned or operated under lease will include 16 quarries containing over 17,000,000 tons of recoverable rock deposits, and large deposits of sand and gravel, as reported by the Henrici-Lowry Engineering Co. of Kansas City, Mo. Eight of these plants are located within the corporate limits of greater Kansas City, serving a population of approximately 600,000, and are able to deliver their products directly by truck, thus effecting a material saving in transportation expense.

Market—Crushed stone is a staple, basic commodity used in large quantities in construction of public highways, for ballast purposes by railroads, and for aggregate in all general construction. The products of the corporation include crushed rock, sand and gravel, which, because of their superior qualities, are in constant demand for these purposes.

The territory served by this corporation embraces the greater Kansas City district, and rich sections in Missouri, Kansas and Iowa. The corporation has obtained a favorable contract with the Missouri State Highway Commission for their crushed stone requirements in this territory. Favorable contracts have also been obtained from the Kansas City Ready Mixed Concrete Co. and the Mid-West Asphalt Co.

The corporation has a capacity for a large volume of production and will be in a position to accommodate large contracts for crushed stone and other products.

Security and Assets—These bonds will be direct obligations of the Consumers Material Corp. and will be secured, in the opinion of counsel, by a closed first mortgage on all fixed assets about to be acquired by the corporation, including leaseholds, lands, buildings, machinery, equipment, etc. The American Appraisal Co. has appraised these properties at a sound depreciated value of $1,265,556, including subsequent additions of $18,412 for new plant and equipment purchased since November 1, 1926, but not including the value of seventeen million tons of deposits. This is in excess of $2,300 for each $1,000 bond of this issue.

The balance sheet of the corporation, giving effect to this financing, will show net tangible assets applicable to these bonds, of $1,465,996 or the equivalent of $2,665 per $1,000 bond. Net current assets will be approximately $200,000, of which $184,000 will be cash.

Provisions—The mortgage deed of trust will provide among other things:

1. No cash dividends shall be paid on the common stock when such payment will reduce net working capital below $250,000.

2. The establishment of a sinking fund into which payments will be made to the trustee monthly of seven cents (7c) per ton of material produced and sold. The total of such sinking fund payments shall amount to not less than $32,500 for the first year of operation and thereafter to not less than $57,500 annually, until all these bonds have been retired. This sinking fund shall be available for the purchase of bonds in the open market at prices below the call price or for their call by lot. These bonds shall be subject to redemption upon thirty days' notice at 105 and accrued interest to April 1, 1932, and thereafter at a price of 1% lower each year or part thereof to maturity. The minimum sinking fund is suffi-

cient to retire this entire issue by maturity.

Earnings—The consolidated net income for the past three years of the properties to be acquired available for interest, depreciation and Federal income taxes, as certified by Messrs. T. J. Hargadon & Co., certified public accountants, has been as follows:

1924	$160,102
1925	241,977
1926	214,300

The $205,460 average annual earnings for the above period are in excess of 5.7 times maximum annual interest requirements of this issue and in excess of two times combined maximum annual interest and fixed sinking fund charges on this issue. The increase in earnings, which it is estimated will result from the combined operation of these properties, are not reflected in the above statement.

CONSUMERS MATERIAL CORP. BALANCE SHEET

December 31, 1926

(After Giving Effect to Proposed Acquisition of Certain Properties and Proposed Financing)

ASSETS

Current assets		
Cash	$ 183,748	
Inventories	28,692	
Total		$ 212,440
Fixed assets		
Land, machinery and tools, auto trucks, plant and equipment		1,265,556*
Deferred charges		
Advanced stripping, bond discount, etc.		123,250
Total		$1,601,246

LIABILITIES

Current liabilities		
Notes payable		$ 12,000
First mortgage 6½% 10-year sinking fund gold bonds		550,000
Contractual liability		
Missouri state Highway Commission		130,000
Capital account—capital stock		
Prior preferred 8% cumulative—callable at $110 in whole or part by lot —authorized issue, 2500 shares, par value $100	$ 250,000	
Less: Unissued	27,400	
Issued and outstanding		$ 222,600
Preferred 7% cumulative—authorized issue, 12,500 shares, par value $100	1,250,000	
Less: Unissued	592,500	
Issued and outstanding		$ 657,500
Common, no par value		
Authorized 17,000 shares		
Less:		
Unissued 7,442 shares		
Issued and outstanding 9,558 shares		
Total		$1,601,246

*As appraised by the American Appraisal Co. with subsequent additions of $18,412 for new plant and equipment purchased prior to December 31, 1926.

Capitalization—The capitalization of the corporation, upon completion of the present financing, will be as follows:

	Authorized	Outstanding
First mortgage 6½% sinking fund gold bonds	$ 550,000	$550,000
Prior preferred stock 8% cumulative	250,000	222,600
7% cumulative preferred stock	1,250,000	657,500
Common stock—no par value	17,000 shares	9,558 shares

Management—The management of the corporation will be in the hands of those responsible for the successful operation of the constituent properties in the past. The board of directors will include men of wide experience in the industry, together with representatives of the bankers.

General—It is confidently expected that the consolidation of these properties will result in numerous benefits, the more important, being as follows:

1. Centralized management, substantially reducing executive, administrative and sales expense.
2. Improved methods of production and uniform supervision.
3. More effective utilization of present equipment, resulting in increased production and lower operating costs.
4. Additional revenue obtained through the sale of by-products.
5. Reduction in transportation expense.

Purpose of Issue—The proceeds of this issue will be used partly to reimburse the treasury of the corporation for the cost of properties acquired, and for other corporate purposes.

New York Trap Rock Bonds Listed on Exchange

THE New York Stock Exchange has authorized the listing of $6,500,000 first mortgage 6% sinking fund gold coupon bonds of the New York Trap Rock Corp., dated December 1, 1926, due December 1, 1946:

NEW YORK TRAP ROCK CORP. AND SUBSIDIARIES

Income Statement Years Ended December 31

	1926	1925
Gross sales	$4,105,963	$3,294,662
Allowances, discounts, etc.	1,158,703	824,220
Net sales	$2,947,260	$2,470,442
Cost of sales	1,619,594	1,369,300
Administrative, selling and general expenses	228,885	189,358
Net operating profit	$1,098,781	$ 911,784
Other income credits	99,248	147,483
Gross income	$1,198,028	$1,059,266
Interest charges	182,658	199,954
Provision for depreciation, etc.	145,532	109,804
Net income	$ 869,838	$ 749,508
Profit and loss credit	18,241	.....
Total surplus	$ 888,079	$ 749,508
Provision for contingencies	.....	73,000
Federal income tax, previous year	79,750	39,122
Dividends on 6% cumulative first preferred stock	322,500	.....
Other items applicable to prior years	21,477	8,125
Balance	$ 464,351	$ 629.260
Surplus at beginning of year	2,055,537	1,426,277
Profit and loss surplus	$2,519,889	$2,055,537

Note.—No provision has been made for federal income tax accrued for the year ended December 31, 1926, amounting to approximately $103,200, nor for New York state franchise tax for the year ending October 31, 1927.

The statement of the New York Trap Rock Corporation and subsidiaries, including Tomkins Cove Stone Co., for the 10 months ended October 31, 1926, as submitted to the New York Stock Exchange, shows net income of $1,043,802 after interest, depreciation, depletion, federal taxes, etc.

South Dakota State Cement Plant Quarterly Report

THE book surplus of the South Dakota state cement plant was increased $38,745.90 during the six months ended March 31, according to the quarterly report of the cement commission, filed recently.

The present surplus is $157,044.95, and that reported on October 31, 1926, was $118,299.05. Depreciation reserves were increased during the period from $162,017.78 to $244,299.74, and depletion reserves were increased from $3,223.07 to $5,119.15. Current liabilities for accounts payable and bag redemption were decreased from $87,276.87 to $46,286.60.

The assets of the plant as reported by the commission are: Current assets, $202,735.85; closed banks and other assets, $10,075.09; inventories of raw and finished stocks, $386,849.07; fixed assets of real estate and personal property, $2,070,236.31.—*Aberdeen* (S. D.) *News.*

Net Earnings of Cement Companies Increasing

NET earnings of cement companies have consistently increased since the war, according to the *Index*, published by the New York Trust Co. "The encouraging feature of the last year in the cement industry was the fact that while production increased 1.4%, consumption increased 2.8%," it is asserted. "Both figures established new records for production, 164,057,000 bbl., and for shipments, 161,781,000 bbl."

The industry's problem has been to find an adequate market for its steadily expanding capacity. Imports have also greatly increased, rising from 122,000 tons in 1921 to more than 3,000,000 in 1926. Of the total American imports, 74% comes from Belgium, but the stabilization of the Belgian franc will probably result in a gradual rise of manufacturing costs which will militate against the maintenance of this Belgian export trade.

Bessemer Limestone "A" Common Put on $3 Basis

INITIAL dividend at the rate of $3 a year has been declared by directors of Bessemer Limestone and Cement Co. on the class "A" common stock of the company, which was organized early this year, when properties of the company with the same name were acquired by interests of Standard Slag Co. The dividend will be 75 cents for the current quarter, payable May 1, to stock on record April 20. No action was taken on the "B" common.—*Warren* (Penn.) *Chronicle.*

Seal Sought on Cement Shipped by Water to Seattle

ALL cement shipped into Seattle, Wash., by water must hereafter be packed in sealed, watertight paper containers and must be delivered on the job with seal unbroken, if an ordinance recommended by its public safety committee recently is passed by the city council.

The ordinance is said to be designed to insure high quality in foreign cement sold at Seattle by making certain that it has not been reground after "setting" during the ocean voyage or while on wharf at that place.—*Seattle* (Wash.) *Post.*

Traffic and Transportation

EDWIN BROOKER, Consulting Transportation and Traffic Expert
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Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly car loadings of sand and gravel, crushed stone and limestone flux (by railroad districts), as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL STONE AND LIMESTONE FLUX

District	Limestone Flux Week ended Apr. 9	Limestone Flux Week ended Apr. 16	Sand, Stone and Gravel Week ended Apr. 9	Sand, Stone and Gravel Week ended Apr. 16
Eastern	3,310	3,648	6,420	8,365
Allegheny	3,474	3,815	6,565	7,667
Pocahontas	486	510	846	876
Southern	523	493	11,145	11,475
Northwestern	1,399	1,246	5,233	5,514
Central Western	503	508	7,884	7,948
Southwestern	234	284	5,033	4,409
Total	9,929	10,504	43,126	46,254

The following are the comparative total loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) for like periods in 1926 and 1927:

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1926 AND 1927

District	Limestone Flux 1926 Period to Date Apr. 17	Limestone Flux 1927 Period to Date Apr. 16	Sand, Gravel and Stone 1926 Period to Date Apr. 17	Sand, Gravel and Stone 1927 Period to Date Apr. 16
Eastern	39,652	48,801	37,723	45,322
Allegheny	51,297	51,292	43,128	57,217
Pocahontas	4,515	3,731	7,197	7,004
Southern	9,847	7,707	140,291	156,899
Northwestern	14,210	15,815	33,628	46,748
Central West'rn	6,994	6,606	92,904	92,012
Southwestern	2,784	4,398	56,025	65,311
Total	129,299	138,350	410,896	460,513

COMPARATIVE TOTAL LOADINGS 1926 AND 1927

	1926	1927
Limestone flux	*129,299*	*138,350*
Sand, stone and gravel	*410,896*	*460,513*

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning May 9:

CENTRAL FREIGHT ASSOCIATION DOCKET

15469. To establish rate of 88c per net ton on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and gravel, carloads, Winona Lake, Ind., to Waynedale, Ind. Present rate, 260c per net ton.

15470. To establish on **agricultural limestone**, unburnt, in open top cars only, stone, crushed, in open top cars, in bulk only, and stone screenings, in open top cars, in bulk only, carloads, Piqua, Ohio, to New Castle and Winchester, Ind. Rates of 95c and 85c per net ton, respectively. Present rate, 127c and 150c per net ton, respectively.

15471. To establish on **gravel and sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), carloads. Rate of 85c per net ton, Wolcottville, Ind., to Warsaw, Atwood and Plymouth, Ind. Present rate, 104c per net ton.

15472. To establish a rate of 214c per net ton on **sand**, viz.: Blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, Coalton, Ohio, to Richmond, New Castle, Lynn, Muncie, Anderson and Winchester, Ind. Present rate, 227c per net ton.

15473. To establish on **gravel and sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), carloads, Madison, Ind., to Osgood, Ind. Rate of 105c per net ton. Present rate, 270c per net ton.

15518. To establish rate of 100c per net ton on **stone, crushed**, in bulk, in open top cars, carloads, Piqua, Ohio, to Marion, Ohio. Present rate, 14c.

15529. To establish a rate of 113c per net ton on **crushed stone**, carloads, Greencastle, Ind., to Lawrenceburg, Greendale and Aurora, Ind. Present rate, 126c per net ton.

15534. To establish on **crushed or ground gravel**, carloads, East St. Louis, Ill., on shipments originating in Missouri, to Lockport, N. Y., rate of 410c per net ton. Present rate, 575c per net ton.

15540. To establish on **crushed stone**, carloads, Milltown, Ind., to various stations on the C. and E. I. Ry. in Indiana, rates (in cents per ton of 2000 lb.) as shown below:

To	Pres.	Prop.	To	Pres.	Prop.
Mt. Vernon	123	120	Mounts	113	105
Erwin	123	120	Owensville	116	105
Wadesville	119	115	McGarey	110	105
Wilson	119	115	Fort Branch	110	105
Poseyville	113	105	Ingle	113	105
Cynthiana	113	105	Haribstadt	110	105
Knowles	113	105			

15542. To establish on **sand** other than blast, engine, foundry, glass, molding or silica), and **gravel**, carloads, South Chicago, Ill., to stations on N. Y. C. R. R. in Indiana, rates (per net ton) as follows:

To	Prop.	Pres.	To	Prop.	Pres.
Dune Park	90	92	La Porte	90	95
Porter	90	92	Rolling Prairie	90	100
Chesterton	90	92	New Carlisle	90	101
Burdick	90	92	Terre Coupee	90	101
Otis	90	92	Lydick	90	101
Durham	90	95	South Bend	90	101
Pinola	90	95			

15543. To establish a rate of 80c per net ton on **sand and gravel**, carloads, Marion, Ohio, to Ohio City and Spencerville, Ohio. Present rate, 160c per net ton.

15554. To establish a rate of 101c per net ton on **gravel and sand**, except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica and gravel, carloads, Kern, Ind., to Yale, Ill. Present rate, 6th class.

15561. To establish on **crushed stone**, carloads, Carey to McVittys, Ohio, following rates (in cents per net ton):

From Carey, Ohio, to Nitro, W. Va., present 151c, proposed 176c.

From McVittys, Ohio, to Charleston, W. Va. (N. Y. C. R. R. (O. C. L.), present 151c, proposed 176c.

From McVittys, Ohio, to Charleston, W. Va. (C. and O. R. R.), present 151c, proposed cancel, class rates apply.

15589. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), and **gravel**, Elkhart, Ind., to Hamlet, Ind., rate of 70c per net ton, and to Kankakee, Ill., rate of 86c per net ton. Present rate—To Hamlet, Ind., 100c and to Kankakee, Ill., 320c per net ton.

15608. To establish on **limestone, fluxing**, carloads, Annandale, Branchton, Harrisville and Wick, Pa., to Donora, Pa., rate of 113c per gross ton. Route—Via B. and L. E. R. R., Butler, Penn., and P. R. R. Present rate, 16½c.

15612. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica), and **gravel**, carloads, Elkhart, Ind., to Donaldson, Ind., rate of 90c per net ton. Route—Via N. Y. C. R. R., Hamlet, Ind., and P. R. R. Present rate, 12c per 100 lb.

15615. To publish rate of 95c per net ton on **crushed stone**, carloads, Monon, Ind., to New Market, Ind. Present rates, 117 per net ton.

15613. To establish rates on sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel**, Summit Grove and Cayuga, Ind., to points on the C. I. & W. R. R. as shown in Exhibit A attached.

EXHIBIT A

Proposed Rates on Sand and Gravel From Cayuga and Summit Grove to C. I. & W. Stations.

Present and proposed rates (in cents per net ton):

To C. I. & W. R. R. Stations—	Present rates.	Prop. rates Cayuga, Summit Grove.
Raven, Ill.	92	85
Scotland, Ill.	92	85
Chrisman, Ill.	92	95
Cherry Point, Ill.	92	95
Metcalf, Ill.	92	95
Hume, Ill.	97	95
Newman, Ill.	97	101
Murdock, Ill.	101	101
Camargo, Ill.	101	101
Ficklin, Ill.	107	101
Garrett, Ill.	107	105
Atwood, Ill.	112	105
Pierson, Ill.	112	105
Hammond, Ill.	112	105
Burrowsville, Ill.	113	105
Lintner, Ill.	113	105
La Place, Ill.	113	105
Casner, Ill.	113	105
Long Creek, Ill.	113	105
Decatur, Ill.	113	105
Boody, Ill.	126	113
Blockland, Ill.	126	113
Osbornville, Ill.	126	113
Mt. Auburn, Ill.	126	113
Bolivia, Ill.	126	113
Robey, Ill.	126	113
Buckhart, Ill.	126	113
Keys, Ill.	126	113
East Springfield, Ill.	126	113
Springfield, Ill.	126	113
Dana, Ind.	92	85
West Dana, Ind.	92	85
Montezuma, Ind.	.....	85
West Melcher, Ind.	.....	85
Bloomingdale, Ind.	.....	85
Marshall, Ind.	.....	88
Guion, Ind.	.....	88
Milligan, Ind.	.....	95
Russellville, Ind.	.....	100
Raccoon, Ind.	.....	101
Roachdale, Ind.	.....	101
Barnard, Ind.	.....	110
North Salem, Ind.	.....	110
Montclair, Ind.	.....	113
Maplewood, Ind.	.....	113
Moorfield, Ind.	.....	113
Indianapolis, Ind.	.....	113
Mecca, Ind.	.....	85

15624. To establish on **sand and gravel**, carloads, minimum weight marked capacity of car, except when loaded to full cubical or visible capacity actual weight will apply, Lafayette, Ind., to Momence, Ill. Rate of 80c per net ton. Present rate, 88c per net ton.

15644. To establish on **crushed** stone and articles taking same rates in bulk, carloads, Delphos, Ohio, to Rivare, Preble and Magley, Ind., rate of 80c per net ton and to Tocsin, Ind., 85c per net ton. Route: Via N. Y. C. & St. L. R. R., Ohio City, Ohio and Erie R. R. Present rates: 11½c to Rivare, Ind., and 13c to Preble, Magley and Tocsin, Ind. (6th class).

15645. To cancel rate of 90c per net ton on **sand and gravel**, carloads, Marietta, Ohio, to Frazeysburg, Hanover, Newark, Heath, Outville, Pataskala, Summit and Columbus, Ohio, on account of no movement of traffic.

15648. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel**, Attica, Ind., to Detroit, Mich. Rate of 175c per net ton. Present rate, 440c per net ton.

15101. **Crushed stone**, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity, actual weight will apply, from Hendler, Penn., to Conyngham and Tomhicken, Penn., $1.05 per ton of 2000 lb. Reason, proposed rate compares fa-

vorably with commodity rates now in effect under similar conditions, mileages and services.

15622. To establish **on sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica and gravel, carloads, minimum weight 90% of marked capacity of car except when car is loaded to full cubical or visible capacity or when owing to the disability of carrier cars cannot safely be loaded to 90% of marked capacity or to full cubical or visible capacity, actual weight will apply, but not less than 50,000 lb., Montezuma, Ind., to points on the C. & E. I. Ry. in Indiana and Illinois, rates as shown in Exhibit A attached.

EXHIBIT A

Proposed rates on sand and gravel from Montezuma, Ind., to C. & E. I. Ry. stations (rates in cents per net ton):

To C. & E. I. Ry. stations— (Via Hillsdale, Ind.)	Present rate.	Proposed rate.
Clinton, Ind.	.....	85
Atherton, Ind.	.....	85
Otter Creek Jct., Ind.	.....	85
North Terre Haute, Ind.	.....	85
Terre Haute, Ind.	97	85
Young, Ind.	.....	85
Pimento, Ind.	.....	85
Seifert, Ind.	.....	90
Farmersburg, Ind.	.....	90
Shelburn, Ind.	.....	95
Reliance, Ind.	.....	95
Sullivan, Ind.	.....	95
Paxton, Ind.	.....	100
Carlisle, Ind.	.....	100
Oaktown, Ind.	.....	100
Emison, Ind.	.....	100
Vincennes, Ind.	.....	110
Newport, Ind.	.....	85
Cayuga, Ind.	.....	85
Perrysville, Ind.	.....	85
Gessie, Ind.	.....	85
Rileysburg, Ind.	.....	85
Brewer, Ind.	.....	88
Oak Lawn, Ill.	.....	88
Danville, Ill.	.....	88
West Newell, Ill.	.....	95
Bismarck, Ill.	.....	95
Alvin, Ill.	.....	95
Rossville, Ill.	.....	95
Hoopeston, Ill.	.....	95
Grape Creek, Ill.	.....	88
Westville, Ill.	.....	88
Steelton, Ill.	.....	100
Riola, Ill.	.....	100
Indianola, Ill.	101	100
Sidell, Ill.	.....	101
Hastings, Ill.	101	101
Allerton, Ill.	.....	101
Broadlands, Ill.	.....	101
Longview, Ill.	.....	101
Fairland, Ill.	.....	101
Henning, Ill.	.....	95
Jamesburg, Ill.	.....	100
Bronson, Ill.	.....	100
Ryan, Ill.	.....	100
Jamaica, Ill.	.....	100
(Via Tuscola, Ill.)		
Craigs, Ill.	.....	101
Bourbon, Ill.	.....	101
Arthur, Ill.	127	105
Cadwell, Ill.	.....	105
Chipps, Ill.	.....	105
Sullivan, Ill.	.....	105
Kirksville, Ill.	.....	113
Findlay, Ill.	.....	113
Westervelt, Ill.	.....	113
Henton, Ill.	.....	113
Dollville, Ill.	.....	113
Pana, Ill.	113	113
Duvall, Ill.	.....	115
Shelbyville, Ill.	.....	115
Baxter, Ill.	.....	115
Clarksburg, Ill.	.....	115
Mode, Ill.	.....	115
Holland, Ill.	.....	115
Moccasin, Ill.	.....	115
Altamont, Ill.	.....	115
West Ridge, Ill.	.....	101
Villa Grove, Ill.	.....	101
Bongard, Ill.	.....	109
Block, Ill.	.....	109
Rutherford, Ill.	.....	109
Tipton, Ill.	.....	109
Glover, Ill.	.....	109
Royal, Ill.	.....	109
Ellis, Ill.	.....	109
Reilly, Ill.	.....	109

15629. To establish on **crushed stone**, carloads, Lewisburg, Ohio, to Liberty, Ind. Rate of 101c per net ton. Present rate, sixth class.

15630. To establish on **crushed stone**, carloads, Greencastle, Ind., to Franklin, Ind., rate of 80c per net ton and to Columbus, Ind., 90c per net ton. These rates not to apply at intermediate points. Present rates: 90c to Franklin, Ind., and 96c per net ton to Columbus, Ind.

15631. To establish on **crushed stone**, carloads, White Sulphur, Ohio, to stations on the N. Y. C. R. R. (O. C. L.) following rates:

(Rates in cents per net ton)

To—	Pres.	Pro.	To—	Pres.	Pro.
South Columbus	90	80	Junction City	90	80
Brice	90	80	New Lexington	90	80
Pickerington	90	80	Moxahala	90	80
Basil	90	80	Rendville	90	80
Baltimore	90	80	Corning	90	80
Thurston	90	80	Rutland	120	110
Pleasantville	90	80	Hobston	120	110
Rushville	90	80	Pomeroy	120	110
Bremen	90	80	Gallipolis	120	110

15632. To establish rate of 100c per net ton on **sand and gravel**, carloads, Middletown, Ohio, to College Corner, Ohio. Present rate, sixth class.

15643. (a) To establish on **limestone**, ground or pulverized in box cars, carloads, minimum weight 50,000 lb., Piqua, Ohio, to C. F. A. territory rating of 60% of 6th class. (b) To cancel specific commodity rates on ground or pulverized limestone in box cars, carloads, from Piqua, Ohio, to C. F. A. territory. Present rate: In absence of specific commodity rates, 6th class rates apply.

15105. **Limestone**, ground or pulverized, and limestone dust, carloads, minimum weight 50,000 lb., from Jamesville, N. Y., to stations on the B. & A. R. R. as follows:

Proposed rate in cents per 100 lb.

To Stations—	
Brookview, N. Y.	11
Van Hoosen, N. Y.	11
Niverville, N. Y.	11
Chatham Center, N. Y.	11
Chatham, N. Y.	11
East Chatham, N. Y.	11
Canaan, N. Y.	11½
State Line, Mass.	11½
Richmond, Furnace, Mass.	11½
Richmond, Mass.	11½
West Pittsfield, Mass.	12
Pittsfield, Mass.	12

Reason—Proposed rates are comparable with rates on like commodity from and to points in the same general territory.

15110. **Sand** (engine, glass and molding) and ground flint, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity, actual weight will apply, from Berkeley Springs District to Washington, N. J., $3.02 per 2000 lb. Reason—Proposed rate is same as that now applicable on the same grades of sand from the Mapleton District to Washington, N. J.

15114. To cancel rate of 11½c per 100 lb. on **limestone**, agricultural, ground, from Cambria, N. Y., to Port Dalhousie, Ont., St. Catharines, Ont., Merritton, Ont., Thorold, Ont., Fonthill, Ont., Port Colborne, Ont. Sixth class rates to apply. Reason—Investigation develops that there has been no movement of this commodity for some time, nor is there any prospect of future movement. Therefore rate is obsolete.

15128. **Crushed stone**, caroads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Oaks Corners, N. Y., to Lehigh Valley R. R. stations, Manchester, Victor, Elmira, Rochester, N. Y., Luzerne, Penn., Lopez, Penn., and various rates ranging from 75c to $1.85 per ton of 2000 lb. Reason—Proposed rates are comparable with rates from Oak Corners (N. Y. C. R. R.) and are also based on the slag mileage scale as per I. C. C. Dockets 13662 and 14204.

15143. **Sand** (blast, engine, foundry, glass, silica and molding), carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity, actual weight will apply, from Depew, N. Y., to Black Rock, Buffalo (East Ferry andd Main streets) and Buffalo Lake, N. Y., 65c per ton of 2000 lb. Reason—Proposed rate is comparable with rates from and to points in the same general territory, as per Erie R. R. Tariffs I. C. C. Nos. 17571 and 17929.

15144. **Gravel and sand**, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity, actual weight will apply, from Attica, N. Y., to Linden, Dale and Warsaw, N. Y., 70c per ton of 2000 lb. Reason—Proposed rates compare favorably with rates on like commodity from and to points in the same general territory as per Erie R. R. Tariff I. C. C. 17571.

15169. **Sand**, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity, actual weight will apply, from South Vineland, Clayville, Millville and Manumuskin, N. J., to Quinton, N. J., 92c per 100 lb., subject to Rule 77. Reason—To establish rate which will be comparable with those in force from same points of origin to points of destination in the same general territory.

WESTERN TRUNK LINE DOCKET

2814A. **Crushed stone**, carload, from Pinehill and Felch, Mich.

To—	Distance	Pres.	Prop.
Chicago, Ill.	*400 †341	‡13½	‖12
St. Paul, Minn.	*476 †418	13½	12
Minneapolis, Minn.	*486 †428	13½	12

*Distance from Pinehill, Mich. †Distance from Felch, Mich. ‡Applies only from Pine Hill. ‖No change proposed from Felch to Chicago.

6025. **Agricultural screenings** or dust (fertilizer limestone), ground sufficiently fine so as to be suitable for acid soil treatment. Minimum weight 90% of marked capacity of car, except that when cars are loaded to full cubical or visible capacity actual weight will apply, but not less than 60,000 lb., from Krause and Valmeyer, Ill., to stations in Missouri. Present—Combination. Proposed—The same scale of rates as now applicable on the same commodity from Carthage, Blackwell and Pixley, Mo., to destinations in Kansas as per Mo. Pac. Tariff 8154, I. C. C. A6905; where the distance is greater than that published in Mo. Pac. Tariff 8154, 5c per ton has been added for each additional block of 10 miles. To illustrate:

From Krause, Ill.—Rates in cents per net ton.

To—	Distance	Pres.	Pro.
C. R. I. & P., via St. Louis—			
Clayton to Vigus, inc.	36.5	(1)	70
Post Oak to Medford, inc.	257.5	(1)	175
C. B. & Q., via St. Louis—			
Bissell to W. Alton, inc.	34.8	(1)	70
Clarence to Macon, inc. (187.5, Wab.)	204.6	(1)	160
Via Wabash to Macon—			
Bevier	192.5	(1)	155
Carrollton	265.2	(1)	185
Via St. Louis—			
Ethlyn to So. Troy, inc.	80	(1)	95
Alexandria	182.9	(1)	150
M. K. T., via St. Louis—			
West Alton	35.4	(1)	70
Wilton to Providence, inc.	179.7	(1)	145

From Valmeyer, Ill.—Rates in cents per net ton.

To—	Distance	Pres.	Pro.
C. R. I. & P., via St. Louis—			
Clayton to Vigus, inc.	48.3	(1)	80
Post Oak to Medford, inc.	269.5	(1)	185
C. B. & Q., via St. Louis—			
Bissell to W. Alton, inc.	46.8	(1)	80
Clarence to Macon, inc. (187.5, Wab.)	216.6	(1)	160
Via Wabash to Macon—			
Bevier	204.5	(1)	160
Carrollton	277.2	(1)	190
Via St. Louis—			
Ethlyn to So. Troy, inc.	92	(1)	110
Alexandria	194.9	(1)	155
M. K. T., via St. Louis—			
West Alton	47.4	(1)	80
Wilton to Providence, inc.	191.7	(1)	155

(1) Combination rate. By shippers.

5664C. **Sand-lime brick**, carload, minimum weight marked capacity of car, between stations in Michigan, Wisconsin and Illinois, state or interstate for distance not exceeding 150 miles. Present—Face brick rates. Proposed—Common brick rates.

5664C. **Sand-lime brick**, carloads, minimum weight marked capacity of car, between stations in Michigan, Wisconsin and Illinois, state or interstate, for distance not exceeding 150 miles. Present, face brick rates; proposed, common brick rates.

3234-D. **Sand**, carloads, minimum weight 90% of marked capacity of car, except that when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity of car, the actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb., from DeSoto, Kan., to points in Kansas. Present and proposed rates to a few representative points are as follows:

To destinations in Group A, A. T. & S. F. Tariff 6642-I:

	Miles.	Rates	
	Via A. T. & S. F.	Pres.	Prop.
Iola, Kan.	94	8½	6½
Chanute, Kan.	111	8½	6½
Trent, Kan.	130	8½	6½
Pitstburg, Kan.	165	10	6½

To destinations in Group B, A. T. & S. F. Tariff 6642-I:

	Miles.	Rates	
	Via A. T. & S. F.	Pres.	Prop.
Garnett, Kan.	67	7	5
Cherryvale, Kan.	141	9	6½
Fredonia, Kan.	137	9	6½
Coffeyville, Kan.	157	10	7
Caney, Kan.	172	10½	7

2556-F. **Sand**, carloads, minimum weight 90% of marked capacity of car, except when loaded to full actual weight, but not less than 40,000 lb. From Bay City, Wis., to Hine, Mo. Present, $3.59 net ton; proposed, $3 net ton.

6045. **Molding sand**, minimum weight capacity of car, Hardin, Colo., to Omaha, Neb., St. Joseph, Mo., Lincoln, Neb., Leavenworth, Kan., Topeka, Kan., Kansas City, Mo.-Kan., and intermediate points. Present, class rates; proposed, $4 per ton.

2051-Z. **Stone, crushed**, carloads, uniform minimum weight, from Sioux Falls, S. D., and Quartzite, Minn., to Winside and Wausa, Neb. Present, to Winside, 9½c (except Sioux Falls, 9c); to Wausa, 13c (except Sioux Falls, 12½c). Proposed, to Winside, 9c; Wausa, 10½c per 100 lb.

2957-C. **Sand**, carloads, minimum weight, usual 90% rule, from Muscatine, Iowa, to Hine, Mo. Present, $3.06 per net ton ($1.76 to St. Louis, $1.30 beyond). Proposed, $2.80 per net ton.

2898-C. **Gravel, sand**, strippings, sand and gravel pit, carloads, minimum weight 90% of marked capacity of car, except that when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity of car, the

actual weight will apply, but in no case shall the minimum weight be less than 40,000 lb., from Prairie du Chien, Wis., to stations on the C. M. & St. P. Ry. in Minnesota.

Rates in cents per 100 lb.:

	Pres.	Pro.		Pres.	Pro.
25 miles	5	3	90 miles	8½	5½
40 miles	5½	3½	100 miles	9	6
50 miles	6½	4	125 miles	10½	7
65 miles	7	4½	150 miles	11	7
75 miles	8	5	175 miles	11½	8
80 miles	8	5	200 miles	12	8

SOUTHERN FREIGHT ASSOCIATION DOCKET

33354. **Stone, broken,** from Calera, Ala., to Alabama points. It is proposed to establish the following reduced intrastate rates on stone, broken, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weight will govern; from Calera, Ala.: To Birmingham, Bessemer, Boyles, North Birmingham, Dolcito Junction and Ensley, Ala., 70c; Holt, Ala., 90c; Gadsden, Ala., 113c; Attala, Ala., 108c; Anniston, Ala., 90c; Talladega, Ala., 86c per net ton.

33424. **Limestone or marble, ground or pulverized,** from Sparta, Tenn., to Waynesboro, Miss. No through rate in effect. Proposed rate on ground or pulverized limestone or marble, carloads, minimum weight marked capacity of car, except when car is loaded to full visible capacity actual weight will apply, from Sparta, Tenn., to Waynesboro, Miss., 261c per net ton, made on basis of the carriers' proposed Georgia scale, less 10%.

33430. **Molding sand,** from Evansville, Ind., to points in Mississippi Valley territory. Class rates now apply. It is proposed to establish the following commodity rates on sand, molding, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weight will apply, from Evansville, Ind.: To Paducah, Ky., 160c; Jackson, Tenn., 195c; Corinth, Miss., Lexington, Ky., 225c; Jackson, Miss., 250c; Laurel, Miss., Hattiesburg, Miss., 275c; Meridian, Miss., 250c; Gulfport, Miss., Mobile, Ala., and New Orleans, La., 300c per net ton. Proposed rates are made in line, distance considered, with rates from Evansville, Ind., to southeastern points.

33491. **Lime,** from Ohio and Mississippi River crossings to Tallahassee, Fla. It is proposed to establish through rates on lime, common, hydrated, quick or slaked, carloads, minimum weight 30,000 lb., from Ohio River crossings and related points to Tallahassee, Fla., based Class "A" differentials Tallahassee over Bainbridge, Ga., over present commodity rates to Bainbridge, Ga. Statement of present and proposed rates will be furnished upon request.

33502. **Stone, broken,** etc., from Maysville, Ky., to Bruce, Nepton and Ewing, Ky. It is proposed to advance the present rate of 3½c per 100 lb. on stone, broken, crushed, rubble or ballast, carloads, minimum weight 40,000 lb., from Maysville, Ky., to the destinations mentioned to be 4c per 100 lb., or not in excess of rate to intermediate points. This will correct error made in tariff publication.

33504. **Stone, crushed,** from Thompsons, Tenn., to Allen's Creek, Tenn.—Cancellation. It is proposed to cancel the commodity rate of 7c per 100 lb. on stone, crushed, carloads, from Thompson, Tenn., to Allen's Creek, Tenn., as published in L. & N. R. R. I. C. C. A15251, account of no movement. Class rate to apply after cancellation.

33522. Agricultural stone, from Russellville, Ky., to Epleys, Red Oak, Lewisburg and Adairville, Ky. It is proposed to establish the following rates on stone, **agricultural (ground limestone),** carloads, minimum weight 60,000 lb., from Russellville, Ky.: To Epleys, Red Oak and Lewisburg, Ky., 63c; to Adairville, 72c per net ton—made in line with rates to other L. & N. R. R. stations in the vicinity of the destinations mentioned.

33537. **Sand,** from Mt. Holly, N. C., to points in the state of South Carolina. At present rates on sand, carloads, are published by the So. Rv. in its Sand and Gravel Tariff I. C. C. A-9890, from Mt. Holly, N. C., to various South Carolina points, which do not apply in connection with the S. A. L. Ry. In fact, that line is not a party to the tariff in question. These rates really have no application, as the sand pits at Mt. Holly are located exclusively on the tracks of the S. A. L. Ry. Further, the rates are not on the proper basis. It is therefore proposed to cancel the rates shown in So. Ry. Tariff. There is, however, a necessity for rates on sand from Mt. Holly to points involved, and it is therefore proposed to establish rates based on the proposed Georgia joint line sale, reduced 10%. Statement of the proposed rates to the destinations involved will be furnished upon request.

33557. **Crushed stone,** from Richmond, Va., to A. C. L. R. R. stations (in Virginia). It is proposed to establish reduced rate of 55c per net ton on crushed stone, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weight will govern, from Richmond, Va., to A. C. L. R. R. stations, South Richmond, Va., to Walthall, Va., inclusive, made on basis of the scale prescribed by the Interstate Commerce Commission (Docket 17517), observing to all points to which rates are suggested, the rate that would apply under the scale to the most distant point from Richmond.

33606. **Sand, molding,** from Evansville, Ind., to Memphis, Tenn. Class rate now applies. Proposed rate on sand, molding, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weight will apply, from Evansville, Ind., to Memphis, Tenn., 225c per net ton, same as rate in effect from Rockport, Ind., to Memphis.

33618. **Gravel,** from Norfolk, Va., to Norfolk Southern R. R. stations. It is proposed to establish rates on slag, crushed, in bulk, carloads, minimum weight 100,000 lb. (when 90% of marked capacity of car is less than 100,000 lb., such 90% of marked capacity of car will apply as minimum), except where cars are loaded to their visible capacity the actual weight will govern, from Norfolk, Va., to Norfolk Southern R. R. stations, Electric Division, North Route and Electric Division, South Route, Currituck Branch and Kempsville Branch—same as currently in effect on gravel and crushed stone, carloads. Proposesd revision represents reductions and statement of present and proposed rates will be furnished upon request.

33625. **Lime,** from Graysville, Melville and Spring City, Tenn., to Louisiana destinations—cancellation. It is proposed to cancel the present commodity rates on lime, carloads, from the origins mentioned to Louisiana destinations as shown in Items 8453 and 8456 of Agt. Speiden's I. C. C. 981, account of no movement.

33639. **Limestone,** from Ladds, Ga., to S. A. L. Ry. north Florida stations. It is proposed to establish through rates on: Limestone, ground or pulverized, carloads, minimum weight marked capacity of car, except when cars are loaded to their visible capacity, actual weight will govern, from Ladds, Ga., to S. A. L. Ry. stations, viz.: Gross, Fla., to Jacksonville, not including Jacksonville; Fernandina, Fla., to Baldwin, Fla., inc.; Jacksonville, Fa. (exclusive), to Chattahoochee River, Fla., inc., made in line with rates in effect to other points in that vicinity. Proposed rates, which are reductions, to representative points are: To Gross, Fla., 237c; Fernandina, Fla., 237c; Baldwin, Fla., 243c; Aucilla, Fla., 243c; Tallahassee, Fla., 261c; River Junction, Fla., 261c per net ton.

33643. **Stone, crushed** or rubble, from Columbia, S. C., to Raeford, N. C. In lieu of combination rate, it is proposed to establish rate of 153c per net ton on: Stone, crushed or rubble, carloads, minimum weight 10% less than marked capacity of car, from Columbia, S. C., to Raeford, N. C., made on basis of carriers' proposed Trunk Line Georgia scale applied to the short line distance.

33646. **Sand and gravel,** from Cincinnati, Ohio, Covington and Newport, Ky., to Knoxvillle Division stations of the Louisville and Nashville R. R. In lieu of present rate of 170c per ton, it is proposed to establish rates of 155c per net ton on: Sand and gravel, straight or mixed carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight shall govern, from the origins mentioned to Saxton, Ky., observing this rate as maximum to intermediate destinations. Proposed rate made with relation to present rate from Louisville, Ky.

33653. **Sand,** from Prattsville Junction and Jackson's Lake, Ala., to L. & N. R. R. stations, viz.: Helen Bess, Hedona and Valley View, Ala. It is proposed to revise the rates of 103c per net ton on: Sand, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight will govern, from the origins mentioned to L. & N. R. R. stations, viz.: Helen Bess, Hedona and Valley View, Ala., to be 100c per net ton, same as in effect from Montgomery, Ala.

33664. **Lime,** from Ladds, Ga., to Mt. Vernon, Ind. Present rate, 450c per net ton; proposed rate on: Lime, common, carloads, minimum weight 30,000 lb., from Ladds, Ga., to Mt. Vernon, Ind., 400c per net ton, based 40c per ton over rates to Evansville, Ind.

33695. **Crushed stone** and marble, from Whitestone and Tate, Ga., to Rutherford, N. J. Combination rates now apply, and it is proposed to establish through rate of 615c per net ton on stone, crushed, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight shall govern (from Whitestone), and marble, crushed, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight shall govern (from Tate), to Rutherford, N. J. Made on the customary basis for rates on these commodities from southern points to eastern and northern points.

33739. **Sand and gravel,** Norris, Ga., to Sumter, S. C. Present rate, 162c per net ton; proposed rate on: Sand and gravel (all kinds), straight or mixed carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight will govern, from Norris, Ga., to Sumter, S. C., 145c per net ton, made on basis of the joint line mileage scale (for distance of 185 miles), prescribed in I. C. C. Docket 17517.

33761. **Crushed stone,** slag, sand and gravel, coated asphalt, from Atlanta, Ga., Birmingham, Ala., Cartersville, Ga., Ladds, Lithonia, Stone Mountain, Ga., Columbia, S. C., Mascot, Tenn., and Montgomery Ala., to all points in Virginia, North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi and Louisiana. It is proposed to establish rates on crushed stone, slag, sand and gravel, coated with asphalt, carloads, minimum weight 90% of capacity of car, from and to points mentioned above, same as now in effect on these commodities in their natural state, or the same as will eventually be published thereon under I. C. C. Docket 17517.

SOUTHWESTERN FREIGHT BUREAU DOCKET

12069. **Sand and gravel,** from points in Missouri to points in Texas. To establish a rate of 24c per 100 lb. on chatts, sand and gravel as described in Item 3718 of S. W. L. Tariff 42-R, from Aurora, Cartersville, Galena, Joplin, Oronogo, Oronogo Junction and Webb City, Mo., to Texas common points with application of Class E differentials to points in Texas taking higher than Texas common point rates. It is stated that the rate of 24c is based on the Dallas-Fort Worth rate of 16½c from Joplin, Cartersville, as published in Items 3718 and 3730, plus the Class E differential over Dallas, Fort Worth Group of 7½c.

TRUNK LINE ASSOCIATION DOCKET

15007. **Agricultural lime,** carload, minimum weight per O. C., from Avis, Pa., to Williamsport, Pa., 8c per 100 lb. Reason—Proposed rate compares favorably with rates on like traffic from and to points in the same general territory.

15028. **Sand** (other than blast, engine, foundry, glass, molding, quartz, silex or silica), carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Temple and Sinking Springs, Penn., to Birdsboro, Penn., 75c per 2000 lb. Reason—Proposed rates are comparable with rates on like commodities from and to points in this same general territory.

15038. (A) **Building lime,** carloads, minimum weight 30,000 lb.; (B) agricultural or land lime, carloads, minimum weight 30,000 lb., and chemical, gas or glass lime, carloads, minimum weight 30,000 lb.; (C) ground limestone, carloads, minimum weight 50,000 lb., from Bellefonte and Pleasant Gap, Penn., to Berlin, Penn., (A) 13c, (B) 12½c, and (C) 10½c per 100 lb. Reason—To establish rates which will be comparable with those in force from other lime and limestone shipping points. File 46938.

15043. **Ground limestone,** carloads, minimum weight 50,000 lb., from Bellefonte and Pleasant Gap., Penn., to Bakerstown, Penn., 12c per 100 lb. Reason—To establish rate which will be comparable with those in force to Bakerstown, Penn., from other ground limestone shipping points. File 46894.

15053. (A) **Building lime,** carloads, minimum weight 30,000 lb.; (B) agricultural, land, chemical, gas or glass lime, carloads, minimum weight 30,000 lb., also ground limestone, carloads, minimum weight 50,000 lb., from York, Penn., to Joannna and Conestoga, Penn., (A) 14c per 100 lb. and (B) 13c per 100 lb. Reason—To establish rates which will be comparable with those in force to points of destination in the same general territory. File 46896.

14905. **Building lime,** carloads, minimum weight 30,000 lb.; agricultural, land, chemical, gas or glass lime, carloads, minimum weight 30,000 lb.; also ground limestone, carloads, minimum weight 50,000 lb., from Knickerbocker, Howellville, Rambo, Blue Bell and Devault, Pa., to Bangor to Bath Pa., inclusive, 13c per 100 lb. Reason—To establish the same rate as is now applicable from Plymouth Meeting, Pa.

14924. (A) **Common sand,** carloads, (B) engine and molding sand, carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Cumberland, Md. (B. & O.), to Eclipse Mine, Experiment, Thomas, Pa., and Roneys Point W. Va. (A) $1.75 per 2000 lb. and (B) 9½c per 100 lb. Reason—Rates are comparable with rates from Cumberland to First Pool Mines, as per Agent Wilson's Tariff I. C. C. A157, also to eliminate fourth section departures.

14925. **Furnace or fluxing limestone,** carloads, minimum weight 90% of marked capacity of car, except when car is loaded to cubical or visible capacity actual weight will apply, from Thomasville, Pa., to Claymont, Del., and Chester, Pa., $1.59 per 2240 lb. Reason—Rate is fairly comparable with others on like commodities from and to points in the same general territory.

14964. **Building lime,** carloads, minimum weight 30,000 lb., from York, Penn., Spring Grove, Penn., Union Bridge, Md., Legore, Md., to Frederick, Penn., incl., Campbell to Wrightsville, Penn., incl., Lemoyne and Hanover, Penn., to Cedarville to Forest Hall, Md., incl., 14½c per 100 lb., **subject to Rule 77.**

Reason: To establish rate which will be comparable with those in force to same destinations from other building lime shipping points as per P. R. R. Tariff G. O.-I. C. C. 14567.

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

11818 (Amended). **Lime,** agricultural and fluxing, having no commercial value for chemical or building purposes, and lime, common, hydrated, quick or slaked, except agricultural or fluxing lime having no commercial value for chemical or building purposes, carloads, minimum weight 40,000 lb., from stations on B. & A., B. & M., N. Y. N. H. & H., Maine Central, and St. J. & L. C. R. R.s, taking rate groups "Boston" or "Lowell," from stations on Rutland R. R., taking rate group "Rutland," and from stations on C. V. Ry. taking group "Burlington" to points in United States named in N. E. F. A. Agency Tariff I. C. C. 50 on basis of estimated differential relationship (from Boston Group, 2c per 100 lb.) over rates established from Philadelphia, Penn., effective Feb. 19, 1927, in Sup. 35 to Agent Wilson's I. C. C. A157 and issued in compliance with I. C. C. decision in its Docket 16170; for example, on lime, agricultural and fluxing, to Rate Basis 100 points from Boston Group stations, 23½c, from Lowell, Burlington and Rutland Group stations, 22½c, and to Rate Basis 60A to 60G points from Boston Group stations, 19c; on lime, common, etc., to Rate Basis 100 points from Boston Group stations, 29c, from Lowell, Burlington and Rutland Group stations, 28c, and to Rate Basis 60A to 60G points from Boston Group stations, 23c; observing minimum rates of 19c and 23c, respectively, from Lowell Group stations; no change in existing rates to Canadian destinations. Reason—To provide rates in line with present relationship to rates from Philadelphia, Penn.

11957 (Amended). From stations on Rutland R. R. taking Rate Group "Rutland" to points subject to Rate Bases 60 to 60G, inclusive, 67 to 67J, inclusive, 70, 70A, 71, 72, 73, 74, 75, 76 and 77 named in N. E. F. A. Agency Tariff I. C. C. 50, on lime, agricultural and fluxing, having no commercial value for chemical or building purposes, carloads, minimum weight 40,000 lb., 19c, and lime, common, hydrated, quick or slaked, except agricultural or fluxing lime having no commercial value for chemical or building purposes, carloads, minimum weight 40,000 lb., 23c. Reason—To provide rates in keeping with these proposed from other New England points following I. C. C. decision in Docket 16170.

12147. **Stone, broken or crushed,** carloads, in bulk, in open cars, minimum weight 90% of marked capacity of car, from Branford (Pine Orchard Quarry), Conn., to New Bedford, Mass., $1.25 per ton of 2000 lb. (Rate to expire on completion of contracts but not later than April 1, 1928.) Reason—To meet competitive conditions.

12154. Blocks, **gypsum** or plaster; gypsum, ground; lime, common, hydrated, quick or slacked, when shipped in mixed carloads with other commodities specified in the item; plaster, calcined (plaster of paris), fireproofing, land, stucco or wall and plaster board, carloads, minimum weight 40,000 lb., from Portsmouth, N. H., to stations on Rutland R. R., Central Vermont Ry., Springfield Terminal Ry. and Montpelier & Wells River R. R., rates comparable for distance involved with those from Oakfield, N. Y., etc. (Statement of proposed rates will be furnished on request.) Reason—Comparable with rates from other plaster shipping points.

12168. **Sand,** common building (not molding, fire, filter or blasting), run of the bank or screened and **gravel,** screened, carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to cubical or visible capacity actual weight will apply, from North Wilbraham, Mass., to Dunwoodie, N. Y., to Ardsley, N. Y., incl.; Elmsford to Milwood, incl.; Kitchawan to Mahopac, incl.; Crafts to Tilly Foster, incl.; Westchester Ave. to Bronxville, incl.; Tuckahoe to Pleasantville, inc.; Chappaqua to Lake Mahopac, incl.; Purdys to Patterson, incl.; Pawling and Dover Furnace; Dover Plains to Amenia, incl.; Sharon and Colemans; Millerton, N. Y., to Philmont, N. Y., incl, commodity rates same as now published on trap rock from Westfield, Mass., per B. & A. R. R. I. C. C. No. 8887, via B. & A. R. R.-N. Y. C. R. R.

12169. **Agricultural lime,** carloads, minimum weight 40,000 lb., from New Haven Junction, Vt., to D. & H. Co. stations, Oneonta, Otego, Wells Bridge, Unadilla, Sidney, Bainbridge, Afton, Nineveh, Harpursville, Tunnel, N. Y., 15c; Sanataria Springs, Port Crane, Binghamton, N. Y., 16c; Center Village, E. Windsor, N. Y., 15c; Windsor, N. Y., Lanesboro, Honesdale, Prompton, Waymart, Fairview, Carbondale, Mayfield, Jermyn, Archbald, Peeksville-Jessup, Olyphant, Dickson, Providence, Green Ridge, Scranton, So. Scranton, Minooka-Taylor, Moosic, Avoca, Pittston, Yatesville, Laflin, Hudson, Miners Mills, Parsons, Plymouth, Wilkes-Barre, Penn., 16c; via Rutland, Vt., and D. & H. Co. Reason—To provide fair commodity rate on low grade commodity used for land dressing.

ILLINOIS FREIGHT ASSOCIATION DOCKET

4038. **Molding sand,** minimum weight marked capacity of car, from Portage, Ill., to Moline, Rock Island, Ill., and Davenport, Ia. (rates in cents per net ton): **Present, combination rate; proposed,** 139.

4039. **Sand and gravel,** minimum weight marked capacity of car, from Rockford, Ill., to C. A. & E. stations, Wayne, Wheaton, Glen Ellyn, Lombard, Villa Park and Elmhurst, Ill. Rates in cents per ton of 2000 lb. **Present,** combination rate; **proposed,** 85.

1526, Sub. 4. **Stone, crushed,** minimum weight marked capacity of car, from Anna, Ill., to Missouri-Illinois R. R. stations (rates in cents per net ton):

To Mo.-Ill. R. R. stations—	Present.	Proposed.
Salem, Ill.	Comb.	100
Robinett, Ill.	Comb.	100
Noltings, Ill.	Comb.	90
Hoyleton, Ill.	Comb.	90
Nashville, Ill.	Comb.	90
McKinley, Ill.	Comb.	90

2913, Sub. 1. **Gravel and sand** (other than bank, glass, molding, silica, blast, core, engine, filtering, fire or furnace, foundry, grinding or polishing or loam sand), crushed refuse gravel, crushed concrete and sand and gravel pit strippings, minimum weight 90% of marked weight capacity of car except when car is loaded to full cubical or visible capacity, actual weight will apply, from Muscatine, Iowa, to Milwaukee and Racine, Wis. **Present,** $1.60 per net ton; **proposed,** $1.30 per net ton.

4047. **Sand and gravel,** from Pekin, Ill., to Pit No. 4, Stoehrs, Ill. **Present,** 63c per net ton; **proposed,** 50c per net ton. Net to C. & I. M. Ry. No switching or other terminal charges absorbed.

4066. **Sand and gravel,** carloads, from Cairo, Ill., to Thebes, Ill. Rates in cents per net ton. **Present,** 84; **proposed,** 76.

TRANSCONTINENTAL FREIGHT BUREAU DOCKET

7791. **Lime,** carloads, W. B. Request that Item 3815, Tariff 4-X (I. C. C. Nos. 64, A-175, 1839 and 1178 of Frank Van Ummersen, H. Wilson, B. T. Jones and H. G. Toll, agents, respectively), be amended to provide for the same carload rates on lime, minimum weight 60,000 lb., as in force under Item 3815, Tariff 1-A (I. C. C. Nos. 63, A-173, 1827 and 1177 of Frank Van Ummersen, H. Wilson, B. T. Jones and H. G. Toll, agents, respectively).

Recent I. C. C. Decisions

18788. Rate of $4.05 per long ton on rock phosphate from Trebolo, Prairie and Morris Mine, Fla., to Macon, Ga., not unreasonable. Rate of $3.45 for future and reparation sought. Complaint dismissed.

F. and S. 2827. Proposed rates on crushed stone from Esmont, Arvonia, Dutch Gap and Rockfish, Va., to Mobile, Ala., New Orleans, La., and Vicksburg, Va., found justified and vacation order as of May 1 ordered suspended and proceeding discontinued.

18940. Attorney-Examiner George M. Curtis in a proposed report, McClain Sand Co. vs. Baltimore and Ohio, has recommended that the Interstate Commerce Commission find that defendant's rates on sand and gravel from complainant's shipping point at or near Point Marion, in western Pennsylvania, to destinations on defendant's lines in West Virginia, are, and for the future will be unjust, unreasonable and unduly prejudicial to the extent that they exceed or may exceed the scale of rates that were found reasonable and that were prescribed in Penn. Sand and Gravel Prod. Asso. vs. B. and O., 104 I. C. C. 717-729, and that were therein intended to apply from Point Marion.

9702. On a rehearing, Memphis-Southwestern investigation, it has been proposed that findings in the previous report, 77 I. C. C. 473, respecting rates on sand and gravel in the portion of the southwest covered by the proceeding, be affirmed. The case was reheard on petition of the Arkansas Highway Commission, who asked that the I. C. C. reduce the prescribed rates, particularly as applied to Arkansas intrastate shipments of gravel made by or for the account of the state.

Silica Sand Rates to the Chicago Switching District

EXAMINER Burton Fuller, in a proposed report in No. 17817, Sub. No. 1, Illinois Silica Sand Traffic Bureau vs. Atchison, Topeka and Santa Fe et al., embracing also No. 15833, Keokuk Shippers' Association et al. vs. B. and O. et al., on further hearing has recommended that the Interstate Commerce Commission find not unreasonable or unduly prejudicial interstate rates on silica sand from the Ottawa, Ill., district to the Chicago switching district, and Chicago rate points, including Gary, Ind., but that rates on like traffic to other destinations in Indiana and to certain destination in Michigan and Wisconsin be found unreasonable but not unduly prejudicial and that reasonable rates be prescribed for the future. He also recommended that findings in the original report in No. 15833, 109 I. C. C. 346, that the rate on molding sand from Ottawa and Utica, Ill., to Keokuk, Iowa, was not shown to be unreasonable but was unduly prejudicial to Keokuk and unduly preferential of Burlington Iowa, and Quincy, Ill., and prescribing non-prejudicial relationships and denying reparation, be affirmed.

In No. 17817 (Sub. No. 1), the commission should find that the interstate rates assailed to the Chicago switching district and Chicago rate points, including Gary, Ind., are not unreasonable or unduly prejudicial. The commission should further find that the other interstate rates assailed are not unduly prejudicial, but are, and for the future will be, unreasonable to the extent that they exceed or may exceed specific rates based on the following scale:

Distance	Rates Single-line (cents)	Joint-line (cents)
20 miles and under	72	96
40 miles and over 20	84	108
60 miles and over 40	100	120
80 miles and over 60	108	132
100 miles and over 80	120	144
125 miles and over 100	132	156
150 miles and over 125	144	168
175 miles and over 150	156	180
200 miles and over 175	168	192
225 miles and over 200	180	204
250 miles and over 225	192	216
275 miles and over 250	204	228
300 miles and over 275	216	240
330 miles and over 300	228	252
360 miles and over 330	240	264
390 miles and over 360	252	276

In computing distances under the foregoing scale, the shortest routes by existing connections for the interchange of carload traffic should be used, embracing as a maximum the lines of not more than three-line haul carriers. Lines under common ownership or control should be considered as a single line, except that where a portion of the same railroad is used more than once, it may be considered as a separate line each time it is used. In applying the rates herein prescribed, reasonable groupings may be employed, provided the rates from and to each group and in the aggregate average substantially the same as if made from and to each point separately under the scale, and provided further that the rates shall in no case exceed the aggregate of intermediate rates from point of origin to destination.

Current Abstracts of Foreign Literature

Effects of Admixtures of $CaCl_2$ on Properties of Cements. Killig shows that $CaCl_2$ may be easily added to the cement in the manner described without rendering difficult the grinding of the selected raw materials, provided these are previously dried at 180 to 200 deg. C. Even very small admixtures of $CaCl_2$ have a beneficial effect on the strength of slag cement, which is probably due to the formation of basic calcium chloride possessing greater activity.

Calcium chloride also has a beneficial effect on the soundness of slag cement. Cements manufactured with such admixtures show no undesirable changes, when cured properly.—*Zement* (1927), **12,** 224-226.

Fused Cement. The fused materials are run from the rotary kiln to a chamber where intimate mixing is given, flux being added if necessary, and the molten mass being then subjected to a reducing process. A nozzle, carrying the heating medium, is so arranged that the hottest part of the flame reaches the kiln outlet. The procedure can proceed on the counter-current principle. *G. Polysius, British Patent No.* 434,187.

Aluminous Cement. A small amount of calcium chloride, fluoride or cryolite, singly or together, is incorporated in the aluminous cement mixture before burning. *Canadian Patent No.* 265,818.

Cement, SO_2 and Lime Silicate from Calcium Sulphate. Calcium sulphate is heated with silica or siliceous materials such as shale in the presence of steam and under an oxidizing condition to a temperature of about 1100 deg. to produce SO_2 gas, lime silicate or cement. Steam can be omitted if heating is carried on by fuels containing a large proportion of hydrogen; for example, oil, producer gas from lignite, etc. *British Patent No.* 244,078.

Quick Hardening Cements with High Lime Contents. Natural substances with high lime sulphate contents such as gypsum and anhydrite are previously and separately freed from all free moisture, finely pulverized and then cooled off. Slags and cement clinker are also separately dried to remove free and hydration water, finely pulverized and cooled off. The anhydrite and cement clinker is ground finer than the slags. The three constituents are then intimately mixed under normal temperature in proportions varying according to the chemical compositions of the individual materials. The following proportions are given as preferable: Slags, 80%; clinker, 5%, and anhydrite, 15%. The slags may be replaced if desired by natural cements and the anhydrite by gypsum whose water content has been reduced to 5% or less. The cement so made is said to be quick-hardening with an early high-strength. *British Patent No.* 264,711.

Process of Heating Lime to Make Lime Blocks, Stucco, etc. Ordinary burnt lump lime is reduced to a granular condition, for instance, so as to pass a 30-mesh sieve, and is fed into an inclined rotary kiln similar to that used in burning portland cement. At the lower end of the kiln, gas containing carbon dioxide and at a temperature of 700-800 deg. C. is introduced, the gas and lime passing in counter-current through the kiln. For the purpose in question the exhaust gases or combustion gases from a lime kiln or a furnace or from a gas producer or burner supplied with producer gas may be used.

The rate at which the lime is fed through the kiln and the rate of withdrawal are controlled so as to secure sufficiently prolonged contact between the lime and the gases in order to attain the desired result; for instance, the time of transfer of the lime through the kiln may be two hours.

When water vapor is used a rotary cylinder externally heated may be used and steam or water introduced into the end of the cylinder remote from that into which the lime is fed.

The product obtained by treating lime in the manner described above is then ground, when it will be found that the product sets in the manner comparable with plaster of paris. It may be mixed with ordinary hydrated or slaked lime to produce mixtures that will also set. The invention is particularly adapted for forming blocks or slabs of the character of gypsum block, the usual aggregate, water, etc., being added and the product molded. *N. V. S. Knibbs, British Patent No.* 245,935.

Refractory Lining of the Rotary Kiln. A report on this subject was recently submitted by Geoffrey Martin at the convention of the refractory materials section of the British Ceramic Society, held in Leeds. As an example, a rotary kiln was selected, who dimensions were: length, 200 ft.; diameter, 9 ft.; diameter in sintering zone, about 10 ft. The following data were established for this kiln:

The lining lasts 3 weeks to 9 months, depending on the skill of the operator. To prevent corrosion of the lining by strongly alkaline substances, the slurry is allowed to pass through the kiln without great heat, when the kiln is being started, so that a coating is gradually formed on the refractories, which becomes strongly cemented to the latter at higher temperatures. Though little information is available, the opinion prevails that products with high alumina content are best suited for linings. Thus bauxite blocks have shown but 1-in. wear after 12 months.

Satisfactory results were obtained with a clinker concrete, mixed in the proportions of 1 part cement to 2 parts clinker, which, however, must be replaced after every interruption of operation. They may be then ground and used as cement.

The table below lists the reactions, temperatures and lengths of the zones in the rotary kiln discussed above. Suitable refractories for the different zones are specified.

Reaction in zone	Temperature deg. C.	Kiln section in ft. from feed end	Refractories to be used.
Drying of raw material	427-482	60 to 70	Ordinary refractories strong, non-porous, 4½ in. thick
Preheating—chemically combined H_2O of clay is driven off ....up to	815	30 ft. long	As in dryer, 6 in. thick.
Carbon dioxide is driven off ..	815-1315	50 ft. long	Good refractories, low in silica, 6 in. thick. (31-33% Al_2O_3, 61-62% SiO_2 3-4% Fe_2O_3, 0.8% TiO_2, 0.5% CaO.)
Clinkering ..	1315-1425	40 ft. long	Lining 9 in. thick (33 to 43% Al_2O_3, 58 to 49-50% SiO_2, 4.5 to 3-4% Fe_2O_3, 1 to 2% TiO_2, 0.7% CaO.)

Zement (1927), 12, 226.

Testing Small Cement Specimens. A new method of testing small cement specimens is suggested by U. Tochterman, based on the work of Prof. H. Kuehl. The specimen is placed between the upper and lower clamps of the machine and is held in place by three knife edges. The upper and lower knife edges eliminate errors due to intervening dust or cement particles. The right and left knife edges transmit the force. They are rounded to obviate local impressions on the specimen. Their distance apart and from the end surfaces of the test specimen is selected so as not to injure the specimen by shearing. The upper beam is balanced by the counterweight in a manner bringing its center of gravity in a horizontal plane passing through the middle knife edge. The lever beam is made as light as possible, so that its weight, transmitted as a load to the specimen, and the moment may be neglected in the test. As the application of the load is clearly indicated by the knife edges, the stress can be accurately determined. Neglecting, as explained above, the weight of the lever, the stress may be regarded as pure bending.

Assuming lever arm length l of 10 cm. and cross section F of 1 sq. cm., the resisting moment is:

$$W = bh^2 = \frac{1}{6} \text{ cu. cm.}$$

The bending moment is as follows:

$$M = l \cdot P = 10P$$

where P is the load represented by the shot and the container. The bending strength $k_b = \frac{M}{W} = 60\ P$ in kg./cm.^{2}. *Tonindustrie-Zeitung* (1927), **17,** 305-6.

Flooded alley by Y. and M. V. depot, Vicksburg, Miss.

Sand bags holding water from Y. and M. V. tracks

Effects of Mississippi River Flood on Rock Products Industries

Production and Distribution of Sand and Gravel at New Orleans Goes on Just the Same—Equipment Used for Flood Relief in Many Cases

By Edmund Shaw
Editor, Rock Products

I REACHED New Orleans on May 4 and found that none of the local industries in which we are interested there had been particularly affected by the high water of the Mississippi river. First I visited the new plant of the Louisiana Portland Cement Co., where everything was proceeding steadily to carry out the plan of going into production by July 1. This plant is on the Industrial canal by which boats go to the Gulf by Lake Pontchartrain. Locks connect it with the Mississippi and at the locks it was easy to see that the level of the river was many feet higher than that of the canal, but nobody appeared to think anything about it.

At the Jahncke Service Co.'s office I was told that neither production nor distribution had been interfered with in the least. I passed by the yards, and from the way the loaded trucks were streaming out it was apparent that the distribution end of the business was certainly going strong. Reports from the remainder of Louisiana were that so far as was known none of the plants in our industries had been damaged, although naturally there had been some slackening of business in the northern part of the state, which was at that time beginning to be flooded. There are many gravel plants near Alexandria and also near Monroe. Monroe is on the edge of the flooded district and I was not able to learn how much the plants in that locality had been interfered with.

So far as New Orleans was concerned, people did not appear to be worried, and the river gage stood pretty steadily at 20.4 ft. I went on the levee, which at that point was covered with a wharf. The water was judged to be about 18 in. below the stringpiece of the wharf and the force of the whirling current showed that a tremendous amount of water was passing on its way to the Gulf. But the conditions were those which had been maintained for days, in fact the water had fallen a few tenths of a foot, and the crevasse dynamited about 14 miles below the city appeared to be relieving the

Unloading plant of the Success Sand and Gravel Co., Vicksburg, showing the seepage water rising in the yard

Railroad tracks along the Yazoo canal under water

Where a paved street and car line used to be (and probably still is!), Vicksburg

pressure. However, it was admitted that the crest of the flood had yet to pass, so that by the time this is read conditions may be altogether different.

Road Damage in Mississippi

I arrived at Jackson, Miss., on the morning of the 7th and visited the state highway department. H. C. Dietzer, chief highway engineer, had just risen from a hospital bed, against the doctor's wishes, for he realized that the first step toward rehabilitating the flooded area would be to get the roads so that trucks could pass over them. The reports made by his field men showed that about 300 miles of improved highway were under water. It was too soon to tell anything of the repairs that would be necessary, but enough was known to show that they would call for a large amount of work and a large expenditure of money. Mr. Dietzer intended to go into the flooded area himself just as soon as he felt that he could stand the trip. He appears to be one of the few men who realized that the break was certain to come long before it came, and he gave orders while he was still in the hospital to prepare for it as fast as possible. The highway department had two truckloads of tents and blankets in the endangered area two days before the first break came.

Greenville Plant Damaged

As to plants that had been injured or destroyed, he know of only one, of those from which the highway department bought material, that was seriously damaged. That was the Greenville plant of the Central Sand and Gravel Co. of Memphis, a subsidiary of the Fischer Lime and Cement Co. This company, it will be remembered, perhaps, lost its plant at Memphis about four years ago, when a long section of the bank caved and slid into the river. I could not learn exactly the damage that had been done to the Greenville plant, and probably no one knew, as the town was still under water. But a Greenville man who knew the plant well, and who has been working for days taking off Greenville refugees, told me that if a protection levee held he thought the plant would suffer only the damage that would come from machinery and equipment being under water—serious enough, it is true, but still not so serious a matter as it would have been if the plant had been swept away into the river.

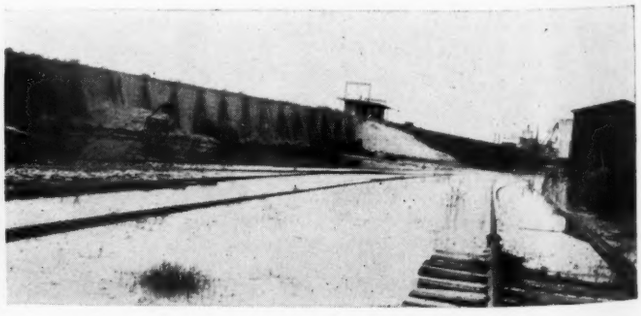
High water along the Yazoo canal, Vicksburg

Most Plants Back from the River

The principal sand and gravel producing areas of Mississippi are not on the river or connected with it in any way. Those which come to mind are the Hattiesburg, Brook Haven, Georgetown and Amory districts. There is a plant or two also on the lower Pearl river near New Orleans. None of these, so far as could be learned, were in any danger, although naturally the business of all of them has been more or less affected.

I first saw real flood conditions by making a trip to Vicksburg on the afternoon on the 7th. Vicksburg itself cannot be flooded, for it is built on the clay (loess) hills that rise a hundred feet or more above the highest water mark. But the tracks of the Yazoo and Mississippi Valley railroad run beside the Yazoo canal that connects Vicksburg with the Yazoo and Mississippi river, and the water had backed up in this until it was about 8 ft. higher than the tracks. A well-built concrete wall holds the water back for a long stretch of this low area and the water was pretty close to the top of it. At the

Refugee boat with cattle on way to pastures



Concrete wall holding back the water at Vicksburg

end of the wall a dirt levee had been built up with sand bags and the water outside was high enough so that some water splashed over every time a motor boat went past.

Vicksburg has one sand and gravel operation, that of the Success Sand and Gravel Co., belonging to James F. Dutton. The office was closed (it was Saturday afternoon) and Mr. Dutton could not be located. Men in neighboring offices told me that he had turned over his towboats and barges to relief organizations and that they were all being used to bring off refugees or the cattle and horses belonging to them. The company has a regular unloading plant for taking sand and gravel from barges and carrying it over the sea wall and into the yard, but this was idle and the yard was empty, and a lot of seepage water was rising in it and flowing to the pumps which were pumping the seepage back into the river a short distance away. A little sand had apparently just been unloaded from a small barge by shoveling it over the sea wall.

Conditions at Vicksburg

Mr. Dutton's turning over his equipment for rescue work is in line with what almost everyone in Vicksburg has been doing for the past week or two. The town has about 18,000 people and it has cared for at least that many refugees. Boats have been coming in at all hours of the day and night, and the refugees had to be met, given food and some sort of shelter had to be found for them. Of course the Red Cross, the National Guard of Mississippi, and the Salvation Army have organized and directed the work, so that now the homeless ones, who are without money or friends who are able to look after them, have been comfortably housed in camps and are being well looked after. But the plain citizens have also done their share.

Flood stage at Vicksburg is given as 45 ft. and on the 6th the gage showed 58 ft., or 13 ft. above flood stage. This is said to be the highest water recorded at this point. But on the 7th it dropped to 57.7 ft., showing that the crest of the flood was passing.

Plants North of Vicksburg Most Damaged

All that I have learned of our industries in the flooded areas farther north has come from reading the papers and talking with some people who had been through them. I got the most information from H. Kraus, who is connected with a lumber company that has large interests in Arkansas and Louisiana. He was in Arkansas when the flood hit that state so hard and was shut up in Hot Springs for nine days. He did not know much of our industries. But he knew that the Ball-Benton plant at Benton must have been under water and that the work of the plants at Little Rock and Pine Bluff must have been seriously interfered with, with a probability of some damage. He had tried to drive over some concrete roads in Arkansas and found them impassable in places because the water had washed the fill from beneath the slab, allowing the slab to settle and break.

His own industry, lumber, he judged, had suffered about as much as any, from the fact that a great deal of piled stock had been washed away and scattered so that it would hardly repay the cost of collecting it. Many of the boards are splintered and broken.

It is altogether too soon to say what will be the effect of the flood on the rock products industries. At this writing it would appear that the damage to plants, except in a few instances, is not large. Production, of course, has been seriously interfered with over large areas. On the other hand, the repairs that must be made quickly and the new work that will almost have to be carried out will call for no small amount of material. The net result may be that production will not vary so much from what it was in 1926, although the peak of production may come somewhat later in the year.

Florida Limerock Association

THE plants represented in the Florida Limerock Association now have a daily capacity of approximately 750 carloads of 50 tons capacity each. Writing on the subject to the *Manufacturers Record,* Willis Calloway, the executive secretary, Jacksonville, says:

"Feeling that you are already familiar with limerock, I will not attempt to go into detail to describe its origin or elements, but will give you some statistics which, in my opinion, will tend to show the magnitude of the industry and its value to the people of Florida. In this association there are 18 member companies. The plants, or quarries, are located adjacent to Ocala, in Marion county, and Williston, in Levy county. There are also deposits and quarries located in Sumter, Citrus, Alachua, Jackson, Suwannee and Hernando counties.

"The plants represented in this association have a potential daily capacity of approximately 750 50-ton cars. During the year 1926, notwithstanding the curtailment of output during the early months due to shortage of railroad equipment and railroad embargo, our members actually shipped between 85,000 and 90,000 carloads of limerock. The production, transportation and consumption of this material is wholly within Florida. In addition, the industry is financed by Florida people, which means that money used in the production, transportation and consumption of Florida limerock originates, circulates and terminates within Florida. Could there possibly be an industry contributing a larger pro rata of its economic energy to the well-being of Florida?

"Limerock is used extensively by the Florida state road department in the construction of state highways. It is also used extensively for base in the paving of many streets in the principal towns and cities."

Iowa Looking for Suitable Gravel Deposits

IOWA state highway engineers have been recently making an extensive survey of the gravel resources in various counties of the state. Local newspapers in the communities visited have commented on their efforts, which up to date have not been very successful. Though the gravel beds at Louisville, Neb., along the Platte river are about 54 ft. thick and fairly clean, the material is too fine for use on the highways, according to the *Shenandoah* (Iowa) *Sentinel.* Considerable limestone suitable for road work has been found, but the ove burden is so great that it is too costly to work the deposits, the same report states.

The *Sigourney* (Iowa) *News* states that the use of crushed rock as a surfacing material for Iowa roads is beginning to receive considerable attention. This material, the report states, seems to offer a much more satisfactory solution for some of the problems met in southern Iowa and in other sections of the state where local gravel is not to be had in satisfactory quality or quantity, rather than the attempt to gravel with imported material.

Allamakee county, it is said, has already experimented on a large scale with crushed rock, and Marshall county has some very good work of this kind. In Allamakee county about 14 miles of crushed rock were put in last year at $2.15 per yard, and 26 miles more have been let this year at $2.12 per yard, placed and spread, for the bulk of the contract. The lowest gravel bid for this was $2.88 per yard of finished work.

Ask Canadian Import Duty on Silica Sand

IMPOSITION of a duty on all imported silica sand, which now enters Canada free of duty, was requested at the recent meeting of the tariff advisory board of Canada. The application was made by Silico, Limited, Montreal, while the Canadian Car and Foundry Co., Montreal, and the Canadian Gas Association, Toronto, opposed the request. Following considerable argument, Chairman W. H. Moore adjourned the hearing until a date to be named for the hearing of further representations.

P. A. Masson, on behalf of Silico, Limited, said that this company had since 1920 operated at a loss the most valuable silica deposit in Canada, situated at St. Canute, Que. A considerable market for silica existed in Canada, he continued, but American and European importations deprived the railways of an important tonnage of traffic. The lack of duty also favored "the exodus of our people and imperils our enterprise by curtailing the scope of its business extension possibilities," stated Mr. Masson.

C. H. Ferminger, Dominion Glass Co., made objection against a tariff on silica sand. The Canadian product, he said, was not satisfactory for glass manufacture.

Co-operative Promotion, Sale and Distribution of Agricultural Limestone

Principal Wisconsin Limestone Quarry Operators Have Legitimate Selling "Trust," Which Is as Beneficial to the Farmers as to the Limestone Producers

By P. D. Southworth

Sales Director, Wisconsin Co-operative Agstone Association, Madison, Wis.

FOR some years our Wisconsin lime and limestone plants have been putting out agricultural limestone. In connection with the agricultural colleges and experiment stations, we have found that the more finely pulverized, most of which will pass a 10-mesh screen, and at least 30% of which will pass a 100-mesh screen, is most economical and suitable for the average farm use.

As this industry grew in this state there were three main factors to deal with. First was advertising. This is carried on thoroughly by the state college, through all of its extension activities, county agents and farm institutes; the agricultural papers are continually pounding on the subject. Second, the old bogey of competition and price-cutting on the part of the manufacturers made it well-nigh impossible to supply the needs of the farmer for a really fine product. This in spite of efforts on the part of the extension department of the university and the advertising and sales work of the companies. Third, a means of equitable distribution and order handling.

As to the first problem, that was being taken care of satisfactorily. In fact, the state was doing the advertising, and the manufacturers were not giving it much co-operation.

Producers Form Sales Merger

As to the solving of the second and third problems, there was only one satisfactory way, and that was for the companies to get together and form a sales merger. This was accomplished under the Wisconsin co-operative law of 1925, which permits corporations to merge and co-operate for the sale of agricultural products. It must be understood that this arrangement is permissible only within the boundary of the state; otherwise, it will come under the Sherman anti-trust law and violate the interstate commerce rulings.

As to possible criticism on account of monopoly, that was removed by the fact that there are vast deposits of limestone in many parts of the state which are open to anyone to develop and work.

Under the state law, the association is held together by membership contracts, in which the duties and obligations are clearly set forth. There are definite and positive penalty clauses for non-co-operation which may run up to a large percentage of the member's business. These provisions have been tested out through the courts up through our Wisconsin Supreme Court and the law, with its governing of member obligations, held valid and constitutional.

Editor's Introduction

SUCH an organization as that described, wherein producers may pool their sales efforts, fix uniform selling prices and divide sales territories is legitimate today only in the State of Wisconsin. Therefore to producers in other states the accompanying article may be of more academic than practical value.

However, the same underlying principles govern all cooperative promotional efforts; and while in Wisconsin penalties are provided by law for producers who do not live up to their agreements with competitors, it may be possible for producers in other states to co-operate in some degree without such penalties, and within the Sherman anti-trust law and similar state laws.

Furthermore, the article is interesting in demonstrating that the power of price-fixing exercised by a group of producers of a farm necessity, may be so exercised as to benefit the farmer as well as the agricultural limestone producer.

—The Editor.

Quality a Prime Consideration

As much of the Wisconsin product is shipped in cold weather, it is found best to have it dry and freeze-proof—either kiln or lime dried,* and shipped in box cars. Also high quality is demanded when it comes to analysis. Screenings and dirt are out of the picture.

It was therefore necessary to make a product along lines recommended by authorities who are certainly well qualified to speak. These recommendations may be of interest to other producers:

COLLEGE OF AGRICULTURE, UNIVERSITY OF WISCONSIN—"The practical question that the farmer raises is one of getting quick action. Where coarser ground material is used, there is no question about its becoming more slowly available. The ideal combination would appear to be a limestone ground to a fineness so that all of the material passes a 10-mesh sieve and at least half, or, better, 60%, would go through a screen with 60 meshes to the linear inch. This mixture, it seems, would supply quickly available material and at the same time some of it would give it a more lasting quality. I think you would be perfectly safe in turning out a product to meet these specifications."

NEW YORK STATE COLLEGE OF AGRICULTURE—"There is no question but that material coarser than 10-mesh does remain in the soil for a long time, but if the soil is really sour, it will take several tons of this coarse material to have much effect on the acidity. It has not been our experience that the finely ground limestone washes out of the soil."

PENNSYLVANIA STATE COLLEGE OF AGRICULTURE—"We have found in Pennsylvania that limestone pulverized just fine enough to pass a 20-mesh screen is the most economical fineness for agricultural use. We have been conducting for a number of years experiments over the state where we are comparing hydrated lime, ground burned lime, and other forms of lime with 20-mesh limestone, and find that limestone of this fineness has the same agricultural value as other materials. This is the recommendation that I furnished the Wisconsin authorities a few months ago, and I believe that it is the most economical form of limestone for agricultural use."

MICHIGAN STATE COLLEGE OF AGRICULTURE—"Many experiments show that the finely ground limestones are much more available than are those ground more coarsely. If particles are too large, they do not dissolve rapidly enough to meet the needs of the soil and crops. We have been suggesting to our farmers that limestone ground so that all of it will pass a 10-mesh screen and 40 to 50% a 100-mesh screen is suitable for agricultural purposes."

OHIO STATE COLLEGE OF AGRI-

*"Lime dried" refers to a patented process of mixing a small percentage of quick lime with the limestone. The lime in turning to the hydrate form absorbs all the water in the stone.

CULTURE—"You are correct in assuming that the finer the material, the more rapidly available it will be in the soil up to a certain point. From what we have been able to see in the use of limestone in this state, we are inclined to believe that a large percentage of it should pass a 10-mesh sieve, and that perhaps 30 to 50% should pass a screen 100 meshes to the inch. Coarser material than this must ordinarily be used in such large quantities as to make it uneconomical."

The brands sold by this association are ground to meet the above specifications.

Distribution and Sales

The problem of distribution had to be worked out along practical and economical lines. Many experiments were tried—there were a great many warm bearings in the machine which had to be adjusted and oiled before they would work smoothly. Under the old individual system, each company shipped in some cases to dealers and in others direct to the farmers. This caused confusion in most instances. Where there was no dealer to take charge of the car, notify the farmers of its arrival, and get it unloaded in time to stop demurrage, check up on shortage and leakages, weigh out the loads and take care of the many things which are necessary in the modern system of merchandising, there was loss, delay and confusion.

The central sales office was established at Madison. The location was decided upon with two main points in view: first, to have it free from the influence of any one company, and, second, to be in close contact with the experiment station of the state university to carry out research work.

Orders are sent to the central office, which maintains a traffic bureau. The orders are sent out to the different plants from this office, and any direct orders received by them are first submitted to the central office. This work is in charge of a general sales director, with a field assistant and several salesmen who are allotted certain territories, selling products on a commission basis. The above may sound quite complicated, but it is very simple in practice. A very small office force handles the orders from all over the state for the five member companies, not only for agricultural limestone, but for other lime products used in agriculture.

Dealers were established all over the state by personal visits and by correspondence. They showed a remarkable degree of farsightedness by offering to co-operate with us and work on a very small profit. They realized that co-operating with the farmers would benefit the dealer directly in increased buying power. The cheaper the lime was put in the hands of the farmer, the better it would be for everyone concerned. All sales are made through these dealers, who take care of shortages, weigh up the split car shipments, take care of commissions, etc.

The dealers are aided by the association's field salesmen, who work from farm to farm, receiving a commission on every ton sold. They gather up small orders into car lots and turn them over to the dealer.

The association is financed by an assessment of a fixed amount against every ton sold. These amounts are paid by the member companies at the end of every month. Budgets are made up by the sales director, subject to approval by a finance committee from the board of directors.

Research

Under modern conditions no industry can hope to succeed unless it carries on research systematically and extensively. Feeding the world and feeding the soil which supplies the world feed is a big job—it takes something more than a ledge of rock and crushing plant. The association realizes this, and with that in mind, the idea of the main office location at Madison is to keep in touch with the agricultural college. The college has done an enormous amount of research work in the use of lime and its products, not only for the direct use on soils, but in any other lines of agriculture. New practices are being developed month by month, and new uses are being found for lime products. It is one of the main objects of the association to do research work in connection with the college of agriculture, keeping up with these activities and putting on the market only such products as have the approval of our state institution and its able corps of technicians.

In this connection the work is progressing rapidly; it will not be very long before a fellowship will be established by the association for research work in connection with the agricultural college.

Organization

The association has just passed through its first year. There have been many difficulties to iron out, and the road is by no means easy for the future, but we have gone far enough to know what benefits one company benefits all. Not only is this true in sales, but in production. The directors of the association are made up of the presidents or general managers of the member companies, to whom the sales department or executive secretary of the association is directly responsible. At the frequent meetings of these directors, not only do sales questions come up for discussion, but any matters of production and plant management. It is a round-table discussion of many problems.

Herewith is a list of the officers of the association: H. M. Halverson, president, Waukesha Lime and Stone Co.; W. A. Titus, vice-president, Standard Lime and Stone Co.; W. A. Rowe, secretary, Wissota Sand and Gravel Co.; R. C. Robertson, treasurer, Western Lime and Cement Co.; K. C. Reudebusch, assistant treasurer, Mayville White Lime Works.

The companies making up this association are the Waukesha Lime and Stone Co., Waukesha; Mayville White Lime Works, Mayville; Western Lime and Cement Co., Milwaukee; Wissota Sand and Gravel Co., Eau Claire; Standard Lime and Stone Co., Fond du Lac.

The author, one-time county agricultural agent and later sales manager for the Wissota Sand and Gravel Co., is sales director. Paul Mathewson is field manager.

Existence Justified

Naturally, there was once considerable agitation about the "trust," "monopoly," "price fixing," etc. True, the price was fixed—the companies couldn't continue in business and put out 10-mesh kiln and lime dried agstone in the winter at screening prices. They put the price where it would pay expenses and a profit, which is business. On the other hand, in the season when production is cheap, they put the price down cheaper than it has ever been.

Through co-operation with the agricultural college and by employing only agricultural short or long course graduates as salesmen, and by maintaining a high degree of intelligence and performance in the sales force, the association has begun to do a lot of real good work for agriculture. Salesmen are equipped with soil-testing apparatus—they go forward with the idea and practice of correct information—sales naturally follow. By the way, the boys "bring home the bacon," too. They are all farm-bred and know rural problems. "High pressure" stuff brings only grief in the long run.

On freight alone, the association, with its allocation of orders, using the short haul factor, has more than justified its existence. Besides, orders are so handled that there is little delay.

On misunderstandings and disagreements over shipments, "the customer is always right." Only one exception to it during the past year—that exception is the one which proves the rule.

The state has granted a great privilege in allowing combinations of producers. With that privilege goes an obligation which must not be overlooked.

Forward-looking legislation and public sentiment is beginning to recognize that combination and co-ordination are two of the big factors which will be the means of solving some of our growing difficulties in industry. Germany, the world's example of industrial efficiency, is building her whole commercial system on the idea of combination and co-ordination.

Are we prudent enough not to abuse the advantages and privileges allowed by intercompany organization, or, as time passes, shall we forget the obligation to the public? Through selfishness and short-sightedness we would suffer the fate meted out to the "trusts" of the 90's, which perished by their own greed—which, through lack of farsighted intelligence and abuse of granted privileges alienated the public and went the way of all world individuals and organizations who do not live up to their obligations. Let us hope we are able to learn by past experience.

Duff A. Abrams New Director of Research of International Cement

THE International Cement Corp., New York, announces the appointment of Prof. Duff A. Abrams as director of research. It also announces plans for the construction of a research laboratory which will be under Professor Abrams' charge.

In connection with Mr. Abrams' appointment the International company has issued the following statement:

"Mr. Abrams has made the study of structural materials his life's work. While attending the University of Illinois, from which he was graduated in 1905, Mr. Abrams spent much of his time in the field working with concrete. The first years after graduation were devoted to important construction projects as well as to experimental work with structural materials, primarily concrete.

"The climax of the first decade of his career came in 1916 when he assumed direct charge of the Structural Materials Research Laboratory as a joint activity of the Lewis Institute and the Portland Cement Association. The work carried on under the direction of Mr. Abrams during the ensuing 10 years rank as one of the outstanding achievements in applied research in American industrial history. From July, 1926, to March, 1927, Mr. Abrams was Director of the Research Laboratory of the Portland Cement Association. Mr. Abrams has justly earned the right to be designated the premier authority on the use of concrete.

"As Director of Research of the International Cement Corp., Mr. Abrams enters upon the third decade of his distinguished career. He will have unlimited scope for his endeavors. The organization of which he now becomes an honored part looks upon the manufacturer of cement through the same glasses that Mr. Abrams views its use. It has labored as unceasingly to improve the quality of its product as Mr. Abrams has labored to improve and develop the technique of its use.

"In addition, wide opportunity for service is afforded to Mr. Abrams in the fact that Lone Star cement is being used in some of the most important construction projects throughout two continents, embracing all kinds of structural conditions and requirements.

"And, finally, he is assured of the sympathetic co-operation of a corporation which realizes that the future growth of its business, as well as of the industry of which it is a part, rests squarely upon the quality of cement itself and upon the methods by which this highly technical product shall be made to serve, to constantly greater advantage, the growing needs of the construction industry.

"The International Cement Corp. has 10 subsidiary companies which operate 11 mills in North and South America. These mills have a combined annual capacity of 14,700,000 bbl. of cement. The eight domestic mills of the International system serve the territory east of the Rocky Mountains, where their product is marketed under the brand name 'Lone Star' cement."

Prof. Duff A. Abrams was born April 25, 1880, at Grand Tower, Ill. His father was Hardin Taylor Abrams and his mother Mary (Kuntz) Abrams. He was graduated from the high school at Murphysboro, Ill., in 1900. He then entered the University of Illinois and received his B. S. degree in civil engineering in 1905. In 1902 he was engaged for three months in field work with the St. Louis, Iron Mountain and Southern railway on railroad location and construction in southern Illinois.

Duff A. Abrams, new director of research, International Cement Corp.

In 1903 and 1904 he worked on the construction of the concrete approach of the Thebes bridge at Thebes, Ill. From 1905 to 1914 he was a member of the staff of the experimental station of the University of Illinois engaged in research work on the properties of concrete, reinforced concrete, timber, steel, brick, etc. In 1908 he had immediate charge of load tests on heavy reinforced concrete track slabs for the Illinois Central railroad at Chicago.

From 1914 to 1925 he was professor in charge of the structural materials research laboratory, Lewis Institute, Chicago, where an extensive research program was carried out on concrete and concrete materials through the co-operation of the Portland Cement Association.

His most important contributions to engineering knowledge were in the studies which lead to the standard methods of testing concrete and concrete materials and in the discovery of the laws on which the water-ratio method of designing and specifying concrete mixtures are based. In July, 1926, Professor Abrams became director of the research laboratory of the Portland Cement Association, Chicago, where this work was merged with the other activities of the association.

His publications include—"Tests of Brick and Terra Cotta Block Columns," 1908; Tests of a 40-ft. Reinforced Concrete Highway Bridge," 1913; "Design of Concrete Mixtures," 1918; "Wear Tests of Concrete," 1921; "Calcium Chloride as an Admixture in Concrete," 1924; "Water-Ratio Method of Designing Concrete," 1927, and many other articles.

Professor Abrams is a fellow of the American Association for the Advancement of Science, vice-president of the American Concrete Institute and is a member of the American Society of Civil Engineers, American Society for Testing Materials, American Ceramic Society, Engineering Institute of Canada, Western Society of Engineers and Sigma XI. During the past seven years he has been secretary of the joint committee on concrete and reinforced concrete. This committee consists of representatives of national engineering societies.

Another New Tennessee Cement Plant Rumored

ERECTION of a cement plant is now being considered at Pikeville, Tenn., according to reports being circulated at Chattanooga and in Pikeville. It was said that tests are now being made on the property for the proposed new plant, which, if erected, will represent an investment of about $2,000,000.

The plant will have a capacity of from 2000 to 2500 bbl. of cement a day, if the present plans are carried out. One of the principals in the undertaking is quoted as saying that he expected plans to be completed within a short time, at which time a definite announcement would be made.

Several Chattanooga business men are said to be financially interested in the undertaking, as well as a group of Pikeville people. The site for the plant is said to be about ten miles from Pikeville, being on the property of the College Coal and Mining Co.—*Chattanooga* (Tenn.) *News.*

Southern Portland of Australia to Start Operations in June

A RECENT communication from Allen Christie, secretary of the Southern Portland Cement Co., Ltd., Sydney, Australia, states that the new cement mill is expected to go into production about June. The first unit capacity is given at from 300,000 to 350,000 tons per year. This, it is expected, will be supplemented by the installation of a second unit of similar capacity before the close of the year. The cement, Mr. Christie says, is of high quality and large sales are in the offing.

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Building a Market

Extracts from a Talk Delivered Before the Members of the Concrete Products Association at Chicago, Illinois, February 22, 1927

By Austin F. Bement

President, Austin F. Bement, Inc., Detroit, Mich.

SOME years ago an incident occurred in New York City which I will never forget because it forcibly impressed me with a significant business lesson.

The president of a large corporation died. I had had some contact with him and knew that he had been connected with that company for a great many years and was familiar with all of the intricate processes of the business—a highly technical one embracing the manufacture of scores of different articles and their sale throughout the world through a distributing organization of thousands of dealers. I had often contemplated with some awe the vast extent and versatility of this individual's knowledge, which I knew it had taken a lifetime to acquire. He had seemed the one man fitted, through experience, to direct the company's activities.

Imagine my surprise when I learned that the board of directors of this great corporation had selected as his successor a man who had spent his life in the railroad business and who was, at the time of his election to the presidency of this manufacturing and sales organization, the president of a railroad.

I later met the new president and one day asked him what he knew about the business which he was now directing. His answer was surprising. He said: "Nothing."

That the directors of this corporation made no mistake in the selection of their new executive has since been evidenced by the increasing prosperity of the organization. This man who knew nothing about the business he undertook to manage has brought it to new peaks of usefulness and earning capacity.

Of course the answer—the lesson—is that in the final analysis the successful direction of any business depends upon much the same basic principles as the direction of any other. The lessons learned in building a market for railroad transportation, in economically operating a great transportation system and in selling the services of such an organization, were the same lessons requisite in another and totally distinct form of enterprise.

Austin F. Bement

Fundamentals of Business Building

The fundamentals of business building are, therefore, in the abstract applicable everywhere and the whole experience of industries in general are the textbook for new industries endeavoring to chart a course for a successful and profitable future.

The advertising agency today is called upon to consult with the heads of many different businesses—businesses which it is not the function of the agency personnel to study minutely from the manufacturing or production standpoint. It is now generally agreed, however, that merchandising and advertising—selling, in other words—is a department of business of equal if not greater importance than production, and what one can learn from the study of successful merchandising methods in the sale of chewing gum or toothpicks may at some point be of value in the sale of locomotives or suspension bridges.

Production has to do with materials and machines, exact things which can be weighted, measured and tested with a great degree of scientific accuracy. But merchandising—the building of a market for a product has to do with people in the mass—the reaching and influencing of minds.

Here we have as our guides mainly experience, or psychology and metaphysics are relatively vague sciences compared with mathematics, chemistry and dynamics. Experience has taught us, however, that, given a good product for which there is a wide use, we may do certain things with a pretty well justified confidence that they will build a receptive market for that product.

You gentlemen are interested in a fundamental thing—building a market for cement products—and you have banded yourselves together behind a program which seems admirably well rounded—on paper. If it fails it is not the fault of the program—it is your fault.

Advantages of Co-operative Efforts

You are to be commended, first, for getting together, for certainly experience has indicated that in co-operation lies the greatest opportunity for expansion in any new industry. You need look no further for ratification of the soundness of your plan of organization than to the Portland Cement Association, which has, I believe, done so much to foster your own.

The manufacture of cement products as an industry is now, I understand, about in the same position the cement industry itself was in twenty years ago, with one important exception. You have back of you and your efforts to build a market for your products twenty years of intense promotional activity on the part of the Portland Cement Association—an activity which has sold the

material of your products to the world and made your effort correspondingly simple.

You here doubtless represent the leaders in your industry, for it is the leaders in any industry who first, because of the vision and capacity which made them leaders, see the need for co-operative effort. You represent at present only 3 to 4% of the total number of companies now manufacturing concrete products in the United States, but by the same token you probably represent a far larger proportion of the total production.

What are the factors you men must consider in planning to build an enlarged market for cement products and how can your organization aid in such a work?

The factors to be considered are: (1) What is your potential market? Where is it? (2) What is your competition? How can you best combat it?

I am taking for granted the fact that your products have merit. The technical advance in the methods of manufacture of useful things from cement concrete we all know has reached a point very satisfactory to engineers, architects, builders and the public. You are not, then, so much concerned in perfecting your products, as are many new industries, as you are in proving the already existing excellence of your products to those who can use them and who, if they do not use them, will use something else.

The Market To Be Reached

You are manufacturing and endeavoring to market a building material, a comparatively new building material which is as yet widely unknown or at least unappreciated. One who has a good thing to sell must consider, first, who can buy it and make use of it, and, second, how to reach those people and convince them of its excellence and desirability.

While you make other cement products than building block tile, certainly those two products form the bulk of your business, a business which last year approximated $140,000,000, but which there seems good reason to believe can be multiplied enormously.

Those whom you have to convince that your products are preferable to substitutes are, of course, those who are about to build —homes, apartments, factories, schools, garages—or who have a hand in the determination of the materials which will enter into public buildings.

In the last analysis, every citizen, every individual in this country, has an interest more or less personal and direct in building materials, and by the same token, in the last analysis, your market is the American people as a whole. Ultimately, then, your aim should be to convince the American public at large that your products are superior. It can be done. It has been done in respect to an absolutely new and hitherto unheard-of product—and in 18 months' times—at a cost of millions. But that is a large order—perhaps too large a program for a new industry like yours to undertake at once. But it does not have to be undertaken at once. The longest journey starts with a single step. But without that step you will never reach your goal. I think you can start with several good, healthy strides. What are they?

It appears to me that you must first in some measure sift out those most likely to influence the increased use of your products, a thing which you no doubt are already doing.

Where to Start

Engineers, architects and builders are distinct classes which can be set apart, tabulated and reached with relative economy. Your association should be and doubtless is making an effective effort to bring the advantages of concrete products to the attention of these classes. You all, no doubt, keep careful watch of building permits, maintain as close contact as is possible with those contractors, architects and builders in your territories, and through direct solicitation (the personal calls of yourselves or your salesmen) bring your products and your service to their attention.

To do this, in the larger territories where some of you are located, would, no doubt, be foolishly extravagant—economically impossible. As any business grows and widens its scope of actual or potential customers, personal solicitation rapidly becomes too expensive to consider. At this point advertising enters, to efficiently and at low cost maintain contact with those with whom you hope to do business. No doubt all of you have already utilized this modern tool of commerce to present the advantages of your products and your personal service to carefully compiled lists of those who might be interested.

Individually you probably cannot use the newspapers efficiently to sell your products, although those of you who have the facilities and the volume to warrant expenditures that will permit reaching the entire public in your communities may, no doubt, do so. All of you, however, can use the mails to place your selling arguments before selected groups, and if you are not doing so you are missing an opportunity to develop new friends and new accounts.

As an association you can afford to undertake in co-operation the important work of general public education. Five per cent of your last year's gross volume of sales would amount to $7,000,000. I do not know the margin between your costs and your selling prices, or any of the factors which permit a determination of a proper advertising budget. Many industries, particularly while young, can and do afford to set aside 10%, and in some instances even a larger proportion of their gross sales, for the purpose of protecting their present volume of business and to build new and enlarged markets.

Long-established industries manufacturing products in general demand, in regard to which the public is already well educated and which have, in short, become practical necessities, can cut this annual appropriation for new market building to below 2% of gross sales volume in dollars.

A Reasonable Advertising Budget

Let us be extremely conservative in considering your problem for the standpoint of the industry as a whole and consider what you could accomplish through the appropriation of 2% annually of your gross sales. With $2,800,000 to expend annually in educating the American public to accept and demand cement products, you could do a very considerable job nationally, to supplement the local and regional efforts put forth by the units in your industry. I appreciate that to secure any such sum would necessitate the membership of a large proportion of the more than 7,000 cement products manfacturers—a thing probably out of the question—and yet it seems to me that there is no reason why you cannot get into your organization enough manufacturers to comprise at least 75% of the entire output. You certainly can do this if you have a sufficient desire to do it and are willing in your own interests and the interests of the industry, to put forth effort and spend time and money to accomplish it.

There will probably not always be 7,000 or 8,000 cement products manufacturers in the Union. Your industry, like others, will go through the years dropping by the wayside those incompetents who cannot or do not properly enlarge their own markets, operate efficiently and make a profit.

It was recently brought out during the New York automobile show that in the last 25 or 30 years—that is, since the birth of the automobile industry in this country—565 different manufacturers have engaged in the business, of which but 53 are now in existence; and, mark this, but 20 of that number produced last year 98.5% of the total of 3,260,900 automobiles, valued at over $3,500,000,000.

Fewer Manufacturers and Bigger Outputs

Whether or not your industry will ever sift into the hands of less than a hundred enterprising and progressive concerns, I do not know. Probably not, as freight rates undoubtedly circumscribe your individual territories. But there are only some 650 main market centers in the Union, and a few adequate, well-managed plants in each of these can doubtless ultimately secure the lion's share of the total business in your line.

Who these concerns will be will be determined by the aggressive policies of their managements, and those of you who appreciate now the wisdom of getting together and co-operating in the great task of selling the American public on your products need not fear, because you will be carrying the umbrella over a certain proportion of the less far-visioned organization destined ultimately for oblivion.

Where is your potential market? It lies in the some 24,000,000 homes of the United States. In the final analysis, there is no reason for you to expect the architect, builder

or contractor to do your selling for you. While thinking about this address I talked with several of my friends who are now building new homes, and inquired to what extent their architects had influenced their decisions as to materials. I was surprised to learn that each of these individuals had pretty well conceived ideas as to what he wanted, prior to the time he called in professional advice.

May it not be that your industry as a whole must sell to the American public the idea that cement products are not a cheap substitute for better and more beautiful materials? That they themselves have elements of beauty superior to their competitors, and other advantages, which will lead the prospective home builder to insist upon concrete instead of upon shingles or face brick?

If, as I understand, concrete block construction is cheaper than ever common brick construction, due to less labor in the laying, is it not possible that this very saving in expense is a barrier which your industry must overcome in building enlarged markets and developing a great demand for your products?

Buying or Developing a Public Demand?

A general public demand, of course, can be bought for any worth-while, useful material or product. It can be bought or it can be developed. Development is a long, slow process, depending for its progress upon the gradual dissemination of favorable opinion through experience and word-of-mouth recommendation. Modern industry seldom waits for the development of a demand. With the tools at hand to go out and buy a demand, the Fabian process of awaiting the development of a reputation and a market has become antiquated. The means are at hand to tell your story to the millions, and the rapidity with which you can reach them, convince them and secure their business, is dependent only upon the sums you can profitably appropriate at once for this purpose.

If you have faith in your products, in their advantages, and if you believe sincerely that they can and do perform a service for their purchaser more valuable than the money he paid for them—superior to the service he can secure from competing materials—then all you need is the courage of your convictions, the willingness to put forth the necessary effort to get together, determine upon a program, raise the funds and aggressively tell your story to the public.

I asked a while back what was your competition. You know it better than I do—brick, stone, terra cotta, building tile, wood. If any of you are fooling yourselves by thinking that you are competing with each other, forget it. You are competing with other industries, well organized, long established, alert and on the job to prevent your conquest of *their* markets. What is your competition doing to maintain its markets and to build enlarged markets?

What Other Associations Have Done

Prior to 1920, common brick was unadvertised and little if any intelligent effort was being made to promote the use of brick. Its manufacturers had it for sale and if you wanted it you could go and buy it, but they did not attempt to sell the public. In 1920, an association was formed, which then comprised 50% of the production. This has now grown to more than 70%. This association spends between $75,000 and $100,000 a year in the general magazines, in the trade papers and on direct-mail advertising, and its secretary says that results are reflected in the constantly increasing sale of plans and books to prospective builders. The advertising of the Common Brick Manufacturers' Association has resulted in the stimulation of the entire industry. Whereas prior to 1920 none of the manufacturers were advertising, now nearly all of the local groups are doing consistent local advertising to tie up with the campaign of the national association.

If organizations such as this and those competing industries are paying your income taxes, then the thing to do is to continue to wait for business while these gentlemen go out and get it. But if they are not, and I assume they are not, I have a final message for you, only one quite obvious piece of advice, and that is, quit fooling and realize that your association can and will accomplish something for your individual good in the building up of your individual fortunes; that you must put intelligent thought and active effort back of it; get together; mean business; lay out a proper, carefully constructed plan of procedure over a period of years; put up the money and get the wheels in motion.

Must Show Signs of Life or Quit

Here is a thought to which you can well give careful consideration. If you men now in the cement products industry do not take advantage of your present position and make the most of it, be assured that others not now in the industry will soon see the potential profits existing in a $140,000,000 industry, capable of great expansion, and will enter it with adequate capital and with aggressive tactics and take it away from you. When any industry reaches the status yours now occupies, you may be certain that strong groups have calculating eyes focused on it, and if your position is weak, it is but an invitation to these others to profit by your pioneer work and wrest from you what you have builded but hold insecurely.

You need a well-financed, strong, central organization representing a far greater proportion of the manufacturers in your industry. You need a comprehensive plan of procedure; you need publicity; you need advertising, and you need individual plans which will fit your own local efforts most effectively into this broad national campaign and make it pay dividends for you.

That this can be done, does not need to be proved. It has been done too many times before by too many other industries to leave it open to question. Whether or not you do it will determine whether you, as individual manufacturers, will go ahead acquiring a larger and larger proportion of the valuable markets waiting, rapidly building a great industry, or whether you will be content to take what business is brought and laid on your doorsteps and what crumbs your competitors may overlook and let you have.

In closing, I wish to quote a paragraph from President Coolidge's speceh before the American Association of Advertising Agencies, delivered at Washington, October 27, last:

"The pre-eminence of America in industry, which has constantly brought about a reduction of costs, has come very largely through mass production. Mass production is only possible where there is mass demand. Mass demand has been created almost entirely through the development of advertising."

Florida Products Men Organize

THE Florida Association of Concrete Products Manufacturers was organized in Tampa recently with the election of Green Cannon of Tampa president and George L. Reed of Jacksonville secretary.

The meeting was held in the Tampa Terrace hotel and was attended by 36 manufacturers, representing 15 of the largest cities of the state.

Arrangements were made for an organization to be formed at a convention in Orlando, May 25.

This organization will co-operate with the local and state chambers of commerce in the promotion of all Florida products and will take an active part in the work for the state-wide building code and other prospective legislation. — *Tampa* (Fla.) *Tribune.*

Re-open Brunswick, Georgia, Products Plant

THE plant of the Southern Cement Stone Co., Brunswick, Ga., which has been idle for many years, has been purchased by a local syndicate of business men, who have already assumed charge and started the plant in operation, according to the *Brunswick* (Ga.) *News.*

C. R. Warndof, formerly connected with the U. S. engineers office, who is one of the syndicate, is to be the active manager of the plant, the report states. New machinery has been ordered and other improvements will be made at once. The plant will be equipped for the manufacture of cement tile, buikling blocks and cement sidewalk blocks.

The plant, which was formerly operated by Col. J. E. duBignon, at one time enjoyed a good business. It was discontinued, however, a number of years ago. The new purchasers believe there is sufficient demand in and around Brunswick for the articles it will manufacture to keep the plant busy at all times.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.30	1.30	1.30	1.30	1.30	1.30
Chaumont, N. Y.	.50	1.75	1.75	1.50	1.50	1.50
Chazy, N. Y.	.75	.....	1.60	1.30	1.30	1.30
Coldwater, N. Y.—Dolomite			1.50 all sizes			
Danbury, Conn.	2.25	2.25	2.00	1.75	1.50	.....
Dundas, Ont.	3.04	1.05	1.05	.90	.90	.90
Frederick, Md.	.50@ .75	1.20@1.30	1.15@1.25	1.10@1.15	1.10@1.15	1.05@1.10
Munns, N. Y.	1.00	1.50	1.50	1.40	1.25	1.25
Northern New Jersey	1.60	1.50@1.80	1.30@2.00	1.40@1.60	1.40@1.60	.....
Prospect, N. Y.	1.00	1.50	1.40	1.30	1.30	.....
Walford, Penn.	.70	.....	1.35h	.....	.....	.....
Watertown, N. Y.	1.00	.....	1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Alton, Ill.	1.85	.....	1.85	.....	.....	.....
Buffalo, Iowa	1.10	.....	1.50	1.30	1.35	1.35
Chasco, Ill.	1.00@1.30	.....	1.00@1.15	.....	1.00@1.15	.....
Columbia, Krause, Valmeyer, Ill.	1.10@1.50	1.10@1.25	1.20@1.35	1.10@1.35	1.10@1.35	‖1.25
Flux (Valmeyer)	1.10@1.50	.....	.....	1.75	.....	1.75
Greencastle, Ind.	1.25	1.25	1.15	1.05	.95	.95
Lannon, Wis.	.80	1.00	1.00	.90	.90	.90
Linwood and Buffalo, Iowa	1.10	.....	1.50	1.30	1.35	1.35
McCook, Ill.	1.00	1.25	1.25	1.25	1.25	1.25
River Rouge, Mich.	1.20	1.20	1.20	1.20	1.20	1.20
Milltown, Ind.	.....	.90@1.00	1.00@1.10	.90@1.00	.85@ .90	.85@ .90
Montreal, Que.	.90	1.35@1.45	1.15	.95	.90	.90
Mt. Vernon, Ill.	1.10@1.20	1.00	1.00	1.00	1.00	.....
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	1.10
Stone City, Iowa	.75	.....	1.25	1.10	1.00	.....
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Toronto, Ont.	1.55	2.05	2.05	1.90	1.90	1.90
Waukesha, Wis.	.90	.90	.90	.90	.90	.....
Wisconsin Points	.50	.....	1.00	.90	.90	.....
Youngstown, Ohio	.70j	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h	1.25l@1.35h
SOUTHERN:						
Alderson, W. Va.	.40	1.45	1.35	1.25	1.20	.....
Atlas, Ky.	.50	1.00	1.00	1.00	1.00	1.00
Brooksville, Fla.	.75	.....	2.65	2.65	2.40	2.00
Cartersville, Ga.	1.50	1.50	1.80	1.35	1.15	1.15
Chico, Tex.	1.00	1.35	1.25	1.20	1.10	1.00
El Paso, Tex.	1.00	1.00	1.00	1.00	.....	.....
Ft. Springs, W. Va.	.50	1.35	1.35	1.20	1.20	.....
Graystone, Ala.	.50		Crusher run, screened, $1 per ton			
Kendrick and Santos, Fla.			3½ in. and less, 1.00 per ton			
Ladds, Ga.	.....	1.65	1.65	1.35	1.15	1.15
New Braunfels, Tex.	.60	1.25	1.10	.90	.90	.90
Rocky Point, Va.	.50@ .75	1.40@1.60	1.30@1.40	1.15@1.35	1.10@1.20	1.00@1.05
WESTERN:						
Atchison, Kans.	.50	1.90	1.90	1.90	1.90	1.80
Blue Springs & Wymore, Neb.	.25	1.45	1.45	1.35c	1.25d	1.20
Kansas City, Mo.	1.00	1.60	1.60	1.60	1.60	1.60
Cape Girardeau, Mo.	.90	1.25	1.25	1.25	1.00	.....
Rock Hill, St. Louis Co., Mo.	1.45	1.45	1.45	1.35	1.35	1.35

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.80	1.70	1.45	1.20	1.05	.....
Duluth, Minn.	.90	2.25	1.75	1.55	1.35	1.25
Dwight, Calif.	1.00	1.00	1.00	.90	.90	.....
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Texas	2.50	2.00	1.55	1.25	1.15	.....
New Haven, New Britain, Meriden and Wallingford, Conn.	.80	1.70	1.45	1.20	1.05	1.05
Northern New Jersey	1.50e	2.10	1.90	1.50	1.50	.....
Oakland and El Cerito, Cal.	1.00	1.00	1.00	.90	.90	.....
Richmond, Calif.	.75	.....	1.00	1.00	1.00	.....
San Diego, Calif.	.70	2.00	1.50	.....	1.25	1.25
Springfield, N. J.	1.70	2.20	2.15	1.70	1.70	.....
Toronto, Ont.	.....	3.58@4.05	3.05@3.80	.....	.....	.....
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	.....

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley, Montello and Red Granite, Wis.—Granite	1.80	1.70	1.50	1.40	1.40	.....
Columbia, S. C.—Granite	.....	2.00	1.75	1.75	1.60	.....
Eastern, Penn.—Sandstone	1.35	1.70	1.65	1.40	1.40	1.40
Eastern Penn.—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Emathla, Fla.			Crushed flint rock, 2.50 per cu. yd.			
Graystone, Ala.—Granite	.50	.....	.....	.....	.....	.....
Lithonia, Ga.	.75a	2.00b	1.75	1.40	1.35	1.25
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	.....
Middlebrook, Mo.	3.00@3.50	.....	2.00@2.25	2.00@2.25	.....	1.25@3.00
Richmond, Calif.—Quartzite	.75	.....	1.00	1.00	1.00	.....
Rochester, N. Y.			Dolomite all sizes $1.50 per ton			
Somerset, Penn. (sand-rock)			1.50 to 1.85			
Toccoa, Ga.	.....	1.35	1.35	1.30	1.25	1.25

*Cubic yd. †1 in. and less. ‡Two grades. ‖Rip rap per ton. (a) Sand. (b) to ⅛ in. (c) 1 in., 1.40. (d) 2 in., 1.30. (e) Dust. (f) ¼ in. (h) less 10c discount. (i) 1 in., 1.40. (j) Less 10% net ton. (l) Less .05.

Agricultural Limestone

(Pulverized)

Alderson, W. Va.—Analysis, 90% $CaCO_3$; 50% thru 50 mesh	1.50
Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 90% thru 100 mesh	6.00
Atlas, Ky.—90% thru 100 mesh	2.00
50% thru 100 mesh	1.00
Bettendorf and Moline, Ill.—Analysis, $CaCO_3$, 97%; 2% $MgCO_3$; 50% thru 100 mesh, 1.50; 50% thru 4 mesh	1.50
Blackwater, Mo.—100% thru 4 mesh	1.00
Branchton and Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers)	5.00
Brandon and Middlebury, Vt.—Pulverized, burlap bags, 6.00; paper, $5.00; bulk	4.00
Cape Girardeau, Mo.—50% thru 50-mesh	1.50
Charleston, W. Va.—Marl, per ton, bulk	3.00
Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk	2.50
Chico, Tex.—50% thru 50 mesh, 1.75; 50% thru 100 mesh	2.25
Colton, Calif.—Analysis 90% $CaCO_3$, bulk	4.00
Cypress, Ill.—90% thru 100 mesh	1.35
Ft. Springs, W. Va.—50% thru 4 mesh	1.50
Hillsville, Penn.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$; 75% thru 100 mesh; sacked	5.00
Hot Springs and Greensboro, N. C.—Analysis, $CaCO_3$, 98-99%; $MgCO_3$, 42%; pulverized; 67% thru 200 mesh, bags	3.95
Bulk	2.70
(Paving dust)—80% thru 200 mesh, bags	4.25@ 4.75
Bulk	3.00@ 3.50
Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.25; bulk	2.75
Joliet, Ill.—Analysis, $CaCO_3$, 55%; $MgCO_3$, 45%; 90% thru 100 mesh	3.50
Knoxville, Tenn.—80% thru 100 mesh, bags, 3.95; bulk	2.70
80% thru 200 mesh, bags, 4.25; bulk	3.00
Ladds, Ga.—Analysis, $CaCO_3$, 64%; $MgCO_3$, 32%; pulverized; 50% thru 50 mesh	1.50@ 2.75
Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.00; bulk	3.50
Marlbrook, Va.—Marl, per ton, bulk	2.25
Marion, Va.—Analysis, 90% $CaCO_3$, pulverized, per ton	2.00
Middlebury, Vt.—$CaCO_3$, 99.05%; 50% thru 200 mesh; sacked	5.50
Milltown, Ind.—Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk	1.35@ 1.60
Olive Hill, Ky.—90% thru 4 mesh	1.00
Piqua, Ohio—Total neutralizing power 95.3%; 99% thru 10, 60% thru 50; 50% thru 100	2.50@ 2.75
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.10; bulk	3.60
99% thru 100, 85% thru 200; bags, 7.00; bulk	5.50
Rocky Point, Va.—Analysis, $CaCO_3$, 95%; 50% thru 200 mesh, burlap bags, 3.50; paper, 3.25; bulk	2.00
Syracuse, N. Y.—Analysis, 89% $CaCO_3$; $MgCO_3$, 4%; bags, 4.25; bulk	2.75
Toledo, Ohio, 30% through 50 mesh	2.25
Waukesha, Wis.—90% thru 100 mesh, 4.50; 50% thru 100 mesh, 2.30; 90% thru 50 mesh	1.65
Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; 50% thru 100 mesh; bags, 4.00; bulk	2.50
West Stockbridge, Mass.—Analysis, 90% $CaCO_3$, 50% thru 100-mesh; cloth bags, 4.50; paper, 4.00; bulk	3.25

Agricultural Limestone

(Crushed)

Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 50% thru 4 mesh	3.00
Atlas, Ky.—90% thru 4 mesh	1.00
Bedford, Ind.—Analysis, 98.5% $CaCO_3$, 0.5% $MgCO_3$; 90% thru 10 mesh; 25% thru 100 mesh; 50% thru 50 mesh	1.50

(Continued on next page.)

Agricultural Limestone

Bridgeport and Chico, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh	1.75
50% thru 4 mesh	1.50
Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh	.80
Columbia, Krause, Valmeyer, Ill.—Analysis, 90% $CaCO_3$; 100% thru 4 mesh	1.10@ 1.50
Cypress, Ill.—90% thru 50 mesh, 50% thru 100 mesh, 90% thru 50 mesh, 90% thru 4 mesh, 50% thru 4 mesh	1.35
Danbury, Conn.—Analysis, 79% $CaCO_3$, 11% $MgCO_3$; 60% thru 100 mesh; 80% thru 50 mesh; 100% thru 4 mesh; bags, 4.25; bulk	3.25
Dundas, Ont.—Analysis, 54% $CaCO_3$; $MgCO_3$, 43%; 50% thru 50 mesh	1.00
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh	1.50
Kansas City, Mo.—50% thru 100 mesh	1.00
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$, 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk	1.60
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 50% thru 50 mesh	1.85@ 2.35
McCook, Ill.—90% thru 4 mesh	.90
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind.—Analysis, 42% $CaCO_3$, 54% $MgCO_3$; meal, 100% thru 4 mesh; 20% thru 100 mesh	1.50
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Mountville, Va.—Analysis, 62.54% $CaCO_3$; $MgCO_3$, 35.94%, 100% thru 20 mesh; 50% thru 100 mesh bags	5.50
Pixley, Mo.—Analysis, 96% $CaCO_3$; 50% thru 50 mesh	1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh	1.65
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@ 1.40
Stone City, Iowa.—Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75
Tulsa, Okla.—Analysis $CaCO_3$, 86.15%, 1.25% $MgCO_3$, all sizes	1.25

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk	3.00
Joliet, Ill.—Analysis, 55% $CaCO_3$; 45% $MgCO_3$; 95% thru 100 mesh	3.50
Piqua, Ohio, sacks, 4.50@5.00 bulk	3.00@ 3.50
Rocky Point, Va.—82% thru 200 mesh, 2.50@3.50 bulk, paper bags	3.75@ 4.75
Waukesha, Wis.—90% thru 100 mesh, bulk	4.50

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Berkeley Springs, W. Va.	2.00@ 2.25
Buffalo, N. Y.	2.00@ 2.50
Cedarville and S. Vineland, N. J.—Damp	1.75
Dry	2.25
Elco, Ill.	*18.00@*31.00
Estill Springs and Sewanee, Tenn.	1.50
Franklin, Penn.	2.25
Gray Summit and Klondike, Mo.	1.75@ 2.00
Los Angeles, Calif.—Washed	5.00
Mapleton Depot, Penn.	2.00@ 2.25
Mendota, Va.	2.25@ 2.50
Michigan City, Ind.	.35
Mineral Ridge and Ohlton, Ohio	2.50
Oceanside, Calif.	3.00
Ohlton, Ohio	2.50
Pittsburgh, Penn.	3.00@ 4.00
Ridgway, Penn.	2.50
Rockwood, Mich.	2.75@ 3.25
Round Top, Md.	2.00
San Francisco, Calif.	4.00@ 5.00
Silica, Va.	2.50
St. Louis, Mo.	2.00
Sewanee, Tenn.	1.50
Thayers, Penn.	2.50
Utica, Ill.	.90
Warwick, Ohio (green)	1.75
Zanesville, Ohio	2.50

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio		1.75
Columbus, Ohio		.15@ .30
Dresden, Ohio		1.00@ 1.25
Eau Claire, Wis.	4.25	1.00
Estill Springs and Sewanee, Tenn.	1.35@ 1.50	1.35@ 1.50

*Ground silica, carload.

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Attica and Franklinville, N. Y.	.75	.75	.75	.75	.75	.75
Boston, Mass.‡	1.40	1.40	2.25		2.25	2.25
Buffalo, N. Y.	1.10	.95	.95			
Erie, Pa.		1.00*		1.50*	1.75*	
Farmingdale, N. J.	.58	.48	.85	1.25	1.15	
Hartford, Conn.	.65*					
Leeds Junction, Me.		.50	1.75		1.25	1.00c
Machias Jct., N. Y.	.75	.75	.85	.75	.75	.75
Montoursville, Penn.	1.00	.85	1.00	.90	.90	.90
Portland, Me.		1.00	2.25		2.00	
Shining Point, Penn.			1.00	1.00	1.00	1.00
Somerset, Penn.		2.00				
South Heights, Penn.	1.25	1.25	.85	.85	.85	.85
Washington, D. C.	.60@ .85	.60@ .85	1.70	1.50	1.50	1.30
York, Penn.	1.10	1.00				
CENTRAL:						
Aurora, Ill.		.40@ .50	.40	.50	.70	.70
Algonquin and Beloit, Wis.	.50	.40	.60	.60	.60	.60
Appleton and Mankato, Minn.		.45	1.25	1.25	1.25	1.25
Attica, Ind.			All sizes .75@.85			
Barton, Wis.		.50	.75	.75	.75	.75
Chicago district, Ill.	.70	.55	.55	.60	.60	.60
Columbus, Ohio		.75	.75	.75	.75	
Des Moines, Iowa	.40	.40	1.40	1.40	1.40	1.40
Eau Claire and Chippewa Falls, Wis.	.40	.40	.65@ .75	.90	.90	
Elkhart Lake, Wis.	.50	.40	.30	.55	.50	.50
Ferrysburg, Mich.		.50@ .80	.60@1.00	.60@1.00		.50@1.25
Ft. Dodge, Iowa	.85	.85	2.05	2.05	2.05	2.05
Grand Haven, Mich.		.60@ .80	.70@ .90	.70@ .90		.70@ .90
Grand Rapids, Mich.		.50		.80	.80	.70
Hamilton, Ohio		1.50			1.50	
Hersey, Mich.		.50				.70
Humboldt, Iowa	.50	.50	1.50	1.50	1.50	1.50
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Joliet, Plainfield and Hammond, Ill.	.60	.50	.50	.60	.60	.60
Mason City, Ia.	.50@ .60	.50@ .60	1.30	1.30	1.20	1.20
Mankato, Minn.		.45	1.25	1.25	1.25	1.25
Mattoon, Ill.	.75@ .85	.60@ .85	.85	.85	.85	.85
Milwaukee, Wis.	.96	.91	1.06	1.06	1.06	1.06
Moline, Ill.	.60@ .85	.60@ .85	1.00@1.20	1.00@1.20	1.00@1.20	1.00@1.20
Northern New Jersey	.50	.50		1.25	1.25	
Pittsburgh, Penn.	1.25	1.25	.85	.85	.85	.85
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
St. Louis, Mo.	1.20	1.45	1.55a	1.45	1.45	1.45
Terre Haute, Ind.	.75	.60	.75	.75	.75	.75
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.		.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	1.25	1.15	1.15	1.15
Zanesville, Ohio		.60	.50	.60	.80	
SOUTHERN:						
Charleston, W. Va. (b)			All sand, 1.40. All gravel, 1.40			
Brewster, Fla.	.45	.45	2.25			
Brookhaven, Miss.	1.25	.70	1.25	1.00	.70	.70
Chattahoochie River, Fla.		.70		1.75		
Eustis, Fla.		.50@ .60				
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Knoxville, Tenn.	1.00	1.00		1.20	1.20	1.00
Macon, Ga.	.50	.50			.95	
New Martinsville, W. Va.	1.00	.90@1.00		1.20@1.30		.80@ .90
Roseland, La.	.35	.35	1.25	1.00	.65	.65
WESTERN:						
Kansas City, Mo.		.70				
Los Angeles, Calif. (d)	.50	.50	1.10	1.10		1.10c
Oregon City, Ore.		1.50*	1.50*	1.50*	1.50*	1.50*
Phoenix, Ariz.	1.25	1.10	2.50	2.00	1.25	1.10
Pueblo, Colo.	.80	.60		1.20		1.15
San Diego, Calif.		.75	1.40	1.20	1.00	1.00
Seattle, Wash. (bunkers)	1.25	1.25	1.25	1.25	1.25	1.25

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.				Dust to 3 in., .40		
Brookhaven, Miss.						.60
Burnside, Conn.	.75					
Chicago district, Ill.	.35					
Ferrysburg, Mich.						.65@1.00
East Hartford, Ohio	.75*					
Gainesville, Texas		1.00			.55	
Grand Rapids, Mich.				.50		
Hamilton, Ohio					1.00	
Hersey, Mich.				.50		
Indianapolis, Ind.			Mixed gravel for concrete work, at .65			
Lindsay, Texas		1.10				.55
Macon, Ga.	.35					
Mankato, Minn.	.30					
Moline, Ill. (b)	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Ottawa, Oregon, Moronts and Yorkville, Ill.			Ave. .60 per ton all sizes			
Somerset, Penn.		1.85@2.00		1.50@1.75		
St. Louis, Mo.			Mine run gravel, 1.55 per ton			
Summit Grove, Ind.	.50	.50	.50	.50	.50	.54
Winona, Minn.	.40	.40				
York, Penn.	1.10	1.06				

*Cubic yd. ‡Delivered on job by truck. (a) ⅝ in. down. (b) River run. (c) 2½ in. and less. (d) Less 10c per ton if paid E.O.M. 10 days. (g) ¾-in. and less.

Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

City or shipping point	Molding, fine	Molding, coarse	Molding, brass	Core	Furnace lining	Sand blast	Stone sawing
Aetna, Ill.				.30@ .35			
Albany, N. Y.	2.25	2.00	2.25	1.50		4.00g	
Arenzville, Ill.	1.50@1.75			1.00			
Beach City, Ohio	1.75@2.00	1.75@2.00		1.75	2.00		
Buffalo, N. Y.	1.50	1.50		2.00@2.50			
Columbus, Ohio	1.50@2.00	1.25@1.50	2.00	.30	1.75@2.00	2.75@4.50	
Dresden, Ohio	1.50@1.75	1.25@1.50	1.50@1.75	1.00@1.25			
Eau Claire & Chippewa Falls, Wis.						3.00	
Elco, Ill.	Ground silica per ton in carloads—18.00@31.00						
Estill Springs and Sewanee, Tenn.	1.25			1.25		1.35@1.50	
Franklin, Pa.	1.75	1.75		1.75			
Klondike, Mo.	1.75@2.00		1.75@2.00	1.75@2.00	1.75@2.00		1.75
Mapleton Depot, Pa.	2.00	1.90	2.00	2.00		2.00	
Massillon, Ohio	2.50	2.50		2.50	2.50		
Mendota, Va.	Ground flint or silex—16.00@20.00 per ton						
Michigan City, Ind.				.30	.30		
Millville, N. J.				1.75b		3.50	
Montoursville, Pa.				1.35@1.50			
New Lexington, O.	2.00	1.25					
Ohlton, Ohio	2.00*	2.00*		1.65*	1.50*	2.50*	1.75*
Ridgway, Penn.	1.50	1.50	1.75@2.00c				
Round Top, Md.				1.60		2.25	
San Francisco and Oakland, Calif.	3.50	5.00	3.50	3.50@5.00e	3.50@5.00	3.50@5.00	
Silica, Va.	Potters' flint per ton, 9.00@10.00						
Thayers, Penn.	1.25	1.25		2.00			
Utica, Ill.	.45@ .90¶	.55@1.00¶	1.00@2.75¶	.45@1.00¶	.50@ .90¶	2.75@3.50¶	.90@3.50¶
Utica, Penn.	1.75	1.75		2.00			
Warwick, Ohio	*1.75@2.25	*1.75@2.25	2.00	*1.75@2.25	*1.75		
Zanesville, Ohio	2.00	1.50	2.00	2.50	2.50		

*Green. †Crude silica, crushed and screened, not washed or dried. ¶Crude. §Crude and dry. (a) Delivered. (b) Damp. (c) Shipped from Albany. (d) Delivered Buffalo or Black Rock. (e) Washed and drained only, 1.50. (f) Dried, screened. (g) Dry.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y., Emporium, Erie and Dubois, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Eastern Penn.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Penn.	2.50	1.00		1.25			
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio		1.30*	1.80*	1.45*		1.45*	
Jackson, Ohio		1.05*		1.30*	1.05*	1.30*	
Toledo, Ohio	1.50	1.25	1.25	1.25	1.25	1.25	1.25
Youngst'n, O., dist.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.		1.50*		1.50*	1.50*	1.50*	
Ensley and Alabama City, Ala.	2.05	.80	1.35	1.25	.90	.90	.80
Longdale, Roanoke, Ruessens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15
Woodward, Ala.	2.05*	.80*	1.35*	1.25*	.90*	.90*	

*5c per ton discount on terms.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.			12.00					2.15e
Buffalo, N. Y.		12.00	12.00	12.00			10.00	1.95d
Chazy, N. Y.		8.50	7.50	10.00		15.50b	8.50	14.00
Lime Ridge, Penn.							5.00a	
West Stockbridge, Mass.	12.00	10.00	5.60					2.00t
Williamsport, Penn.			10.00				6.00	
York, Penn.		9.50	9.50	10.50	8.50	10.50	8.50	1.65i
CENTRAL:								
Afton, Mich.							8.50	1.35
Carey, Ohio	12.50	8.50	8.50		9.00		8.00	
Cold Springs, Ohio		8.50	8.50				8.00	
Cold Springs and Gibsonburg, Ohio	12.50	8.50	8.50		9.00	11.00		
Huntington, Ind.	12.50	8.50	8.50		9.00		8.00	
Luckey, Ohio	12.50							
Milltown, Ind.		8.50@10.00		10.00p			8.50s	1.35r
Scioto, Ohio	12.50j	8.50	8.50	10.00	.62½	7.50	1.50c	1.70d
Sheboygan, Wis.	11.50				9.50		9.50	.95
Wisconsin points (f)		11.50					9.50	
Woodville, Ohio	12.50	8.50	8.50	13.50	9.00		9.00	1.50c
SOUTHERN:								
Allgood, Ala.	12.50	10.00			8.50		8.50	1.50
El Paso, Texas							7.00	
Graystone & Landmark, Ala.	12.50	9.00	9.00	9.00@10.00			8@10	1.35
Keystone, Ala.	12.50	9.00	9.00	9.00			8.00	1.35
Knoxville, Tenn.	20.25	9.00	9.00	9.00	8.00		8.00	1.35
New Braunfels, Tex.	18.00	12.00	10.00	12.00	10.00		9.50	
Ocala, Fla.		11.00	9.00				11.00	1.50
Saginaw, Ala.	12.50	10.00	9.00	10.00			8.50	1.50
WESTERN:								
Kirtland, N. M.							15.00	
Limestone, Wash.	15.00	15.00	10.00	15.00	16.50	16.50	16.50	2.09
Los Angeles, Calif.	19.00	19.00	14.00		16.20		12.50	2.50
Dittlinger, Tex.		12.00@13.00					9.50p	1.50s
San Francisco, Calif.	21.00	19.00	16.50				14.00	2.00
Tehachapi, Calif.					11.80			
Seattle, Wash.	19.00	19.00	12.00	19.00	19.00		18.60	2.30

†50-lb. paper bags; (a) net ton; (c) wooden, steel 1.70; (d) steel; (e) per 180-lb. barrel; (f) dealers' prices, net 30 days less 25c disc. per ton on hydrated lime and 5c per bbl. on lump if paid in 10 days; (i) 180-lb. net barrel, 1.65; 280-lb. net barrel, 2.65; (p) to 11.00; (q) to 8.75; (r) to 1.50; (s) in 80-lb. burlap sacks; (t) to 3.00; (u) two 90-lb. bags; (v) oil burnt; wood burnt 2.25@2.50; (x) wood, steel 2.30; (z) to 15.00; (*) quoted f.o.b. New York; (†) paper bags; (¶) to 10.00; (1) 80-lb. paper bags; (2) to 3.00; (3) to 9.00; (4) to 1.60; (5) to 16.00; (6) wood bbl., steel, 1.80; (7) quoted f.o.b. Marble Cliff, Ohio; (8) superfine; (9) barrels; (10) f.o.b. Woodville.

Miscellaneous Sands

(Continued)

City or shipping point	Roofing sand	Traction
Mapleton Depot, Penn.	1.50	2.00@ 2.25
Massillon, Ohio		2.25
Michigan City, Ind. (Engine sand)		.20@ .30
Mineral Ridge, Ohio	*1.75	*1.75
Montoursville, Penn.		1.00@ 1.10
Ohlton, Ohio	a1.75	a1.60
Red Wing, Minn.		1.25
Round Top, Md.	2.25	1.75
San Francisco, Calif.	3.50	3.50
Thayers, Penn.		2.25
Utica & Ottawa, Ill.	b.90@ 3.50	.90
Warwick, Ohio		2.25
Zanesville, Ohio		2.50

*Wet. †Fine; coarse dry, 3.00@3.50.
(a) Green. (b) Dried, screened.

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Baltimore, Md.:	
Crude talc (mine run)	3.00@ 4.00
Ground talc (20-50 mesh), bags	10.00
Cubes	55.00
Blanks (per lb.)	.08
Pencils and steel worker's crayons	.08
per gross	1.00@ 1.50
Chatsworth, Ga.:	
Crude talc, grinding	5.00
Ground talc (150-200 mesh) bags	10.00
Pencils and steel worker's crayons, per gross	1.00@ 2.50
Chester, Vt.:	
Ground talc (150-200 mesh), bulk	8.00@ 9.00
Including bags	9.00@10.00
Chicago and Joliet, Ill.:	
Ground (150-200 mesh), bags	30.00
Dalton, Ga.:	
Crude talc (for grinding)	5.00
Ground talc (150-200), bags	10.00
Pencils and steel workers' crayons, per gross	1.00@ 1.50
Emeryville, N. Y.:	
(Double air floated) including bags;	
325 mesh	14.75
200 mesh	13.75
Hailesboro, N. Y.:	
Ground white talc (double and triple air floated) including bags, 300-350 mesh	15.50@20.00
Henry, Va.:	
Crude (mine run)	3.50@ 4.00
Ground talc (150-200 mesh), bulk	8.50@16.00
Joliet, Ill.:	
Roofing talc, bags	12.00
Ground talc (200 mesh), bags	32.00
Keeler, Calif.:	
Ground (200-300 mesh), bags	20.00@30.00
Natural Bridge, N. Y.:	
Ground talc (125-200 mesh), bags	10.00@15.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Columbia, Tenn.—B.P.L. 65-70%	3.50@ 4.50
Gordonsburg, Tenn.—B.P.L. 65-72%	3.75@ 4.50
Mt. Pleasant, Tenn.—B.P.L. 75%	5.50@ 6.00
Tennessee—F.O.B. mines, gross ton, unground brown rock, B.P.L. 72%	5.00
B.P.L. 75%	6.00
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	8.00@ 9.00

Ground Rock

(2000 lbs.)

Centerville, Tenn.—B.P.L. 65%	8.00
Gordonsburg, Tenn.—B.P.L. 65-70%	4.00@ 4.50
Mt. Pleasant, Tenn—B.P.L. 72%	4.50@ 5.00
Twomey, Tenn.—B.P.L. 65%	8.00@ 9.00

Florida Phosphate

(Raw Land Pebble)

(Per Ton.)

Florida—F. O. B. mines, gross ton,	
68/66% B.P.L., Basis 68%	3.25
70% min. B.P.L., Basis 70%	3.75

Mica

Prices given are net, F.O.B. plant or nearest shipping point.

Pringle, S. D.—Mine run, per ton	125.00
Punch mica, per lb.	.06
Scrap, per ton, carloads	20.00
Rumney Depot, N. H.—per ton,	
Mine run	360.00
Clean shop scrap	25.00
Mine scrap	22.00
Roofing mica	30.00
Punch mica, per lb.	.12
Cut Mica—50% from Standard List.	

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Barton, Wis., f.o.b. cars	.....	10.50
Brandon, Vt.—English pink, English cream and coral pink	*11.00	*11.00
Brandon grey	*11.00	*11.00
Brighton, Tenn.—Pink	6.00	5.00
Mixed pink and bronze	4.50@ 6.00	4.50@ 6.00
All colors, mixed sizes	3.50	3.50
Buckingham, Que.—Buff stucco dash	.....	12.00@14.00
Chicago, Ill. — Stucco chips, in sacks f.o.b. quarries	.....	17.50
Crown Point, N. Y.—Mica spar	.....	9.00@10.00
Dayton, Ohio	.....	6.00@24.00
Easton, Penn., and Phillipsburg, N. J.	.....	12.00@16.00
Haddam, Conn. — Felstone buff	15.00	15.00
Harrisonburg, Va.—Bulk marble (crushed, in bags)	†12.50	†12.50
Ingomar, Ohio — Concrete facings and stucco dash	.....	32.00
Middlebrook, Mo.—Red	.....	20.00@25.00
Middlebury, Vt.—Middlebury white	‡9.00	‡9.00
Middlebury and Brandon, Vt.—Caststone, per ton, including bags	.....	5.50
Milwaukee, Wis.	.....	14.00@34.00
Newark, N. J.—Roofing granules	.....	7.50
New York, N. Y.—Red and yellow Verona	.....	32.00
Red Granite, Wis.	.....	7.50
Stockton, Calif. — "Natrock" roofing grits	.....	12.00@20.00
Tuckahoe, N. Y.—Tuckahoe white	12.00	.....
Wauwatosa, Wis.	.....	20.00@25.00
Wellsville, Colo.—Colorado Travertine Stone	15.00	15.00

*Carloads, including bags; L.C.L. 14.50.
†C.L. L.C.L. 17.00.
‡Carloads, including bags; L.C.L. 10.00.

Potash Feldspar

Auburn and Topsham, Me.—Color white; 98% thru 140-mesh bags, 22.00; bulk	19.00
Bristol, Tenn.—Color, white; analysis, K_2O, 6 to 10%; Na_2O, 2½ to 4%; SiO_2, 68 to 78%; Fe_2O_3, 12 to 20%; Al_2O_3, 16.5 to 18.5%; 99% thru 200 mesh; bulk, depending on grade	14.50@18.00
Buckingham, Que.—Color, white; analysis, K_2O, 12-13%; Na_2O, 1.75%; bulk	9.00
De Kalb Jct., N. Y.—Color, white; bulk (crude)	9.00
East Hartford, Conn.—Color, white, 95% through 60 mesh, bags	16.00
96% thru 150 mesh, bags	28.00
East Liverpool, Ohio—Color, white; 98% thru 200 mesh, bulk	19.35
Soda feldspar, crude, bulk, per ton	22.00
Glen Tay Station, Ont., color, red or pink; analysis: K_2O, 12.81%, crude (bulk)	7.00
Keystone, S. D.—Prime white, bulk (crude)	8.00
Los Angeles, Calif. — Color, white; analysis, K_2O, 12.16; Na_2O, 1.53; SiO_2, 65.60; Fe_2O_3, .10; Al_2O_3, 10.20; crude	10.05
Pulverized, 95% thru 200 mesh; bags, 22.00; bulk	20.00
Murphysboro, Ill.—Color, prime white; analysis, K_2O, 12.60%; Na_2O, 2.35%; SiO_2, 63%; Fe_2O_3, .06%; Al_2O_3, 18.20%; 98% thru 200 mesh; bags, 21.00; bulk	20.00
Penland, N. C.—Color, white; crude, bulk	8.00
Ground, bulk	16.50
Tenn. Mills—Color, white; analysis K_2O, 18%; Na_2O_3, 10%; 68% SiO_2; 99% thru 200 mesh; bulk	18.00
99% thru 140 mesh, bulk	16.00
Toronto, Can.—Color, flesh; analysis K_2O, 12.75%; Na_2O, 1.96%; crude	7.50@ 8.00

Chicken Grits

Afton Mich. (limestone) per ton	10.00
Belfast and Rockland, Me.—(Limestone), bags, per ton	‡10.00
Brandon and Middlebury, Vt., per ton	10.00
Cartersville, Ga.—(Limestone), per bag	2.00
Centerville, Iowa (gypsum) per ton	18.00
Chico, Texas (limestone), 100 lb. bags, per ton	8.00@ 9.00
Danbury, Conn. (limestone), bulk	6.00@ 7.00
Easton, Penn.—Per ton, bulk	3.00
Joliet, Ill.—(Limestone), bags, per ton	4.50
Knoxville, Tenn.—per bag	1.25
Los Angeles, Calif. (feldspar) per ton	15.00
Gypsum, Ohio.—(Gypsum) per ton	10.00
Limestone, Wash. (limestone) per ton	12.50
Marion, Va.—(Limestone), bulk, 5.00; bagged, 6.50; 100-lb. bag	.50
Rocky Point, Va. (limestone) 100 lb. bags, 50c; sacks, per ton, 6.00 bulk	5.00
Seattle, Wash.—(Limestone), bulk, per ton	10.00
Warren, N. H.—(Mica) per ton	3.85@ 3.90
Waukesha, Wis.—(Limestone), per ton	8.00
West Stockbridge, Mass.—(Limestone) bulk	‡7.50@*9.00
Wisconsin Points (limestone) per ton	9.00

*L.C.L. †Less than 5-ton lots. ‡C.L.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Albany, N. Y.	10.00
Anaheim, Calif.	10.50@11.00
Barton, Wis.	10.50@13.00b
Boston, Mass.	*17.00
Brighton, N. Y.	*19.75
Brownstone, Penn.	11.00
Dayton, Ohio	12.50@13.50
Detroit, Mich.	13.50@15.00
Farmington, Conn.	13.00
Flint, Mich.	¶12.00@17.50*
Grand Rapids, Mich.	12.50
Hartford, Conn.	*18.50
Jackson, Mich.	12.25
Lakeland, Fla.	10.00@11.00
Lake Helen, Fla.	9.00@15.00
Lancaster, N. Y.	12.25
Madison, Wis.	12.50
Michigan City, Ind.	11.00
Milwaukee, Wis.	*13.00
Minneapolis and St. Paul, Minn.	10.00
Minnesota Transfer	10.00
New Brighton, Minn.	10.00
Pontiac, Mich.	14.50
Portage, Wis.	16.00
Prairie du Chien, Wis.	18.00@22.50
Rochester, N. Y.	*19.75
Saginaw, Mich.	13.00
San Antonio, Texas	16.00
Sebewaing, Mich.	12.00
Sioux Falls, S. Dak.	13.00c
South River, N. J.	14.00
Syracuse, N. Y.	18.00@20.00*
Toronto, Canada	11.00@13.50*
Wilkinson, Fla.	10.00@12.00
Winnipeg, Canada	14.00

*Delivered on job. †Delivered in city. ‡Less 5%. ¶Dealers' price. (a) Less .50 E.O.M. 10 days. (b) Delivered to Milwaukee. (c) Delivered at yard.

Portland Cement

Prices per bag and per bbl, without bags net in carload lots.

	Per Bag	Per Bbl.
Albuquerque, N. M.	.86¾	3.47
Atlanta, Ga.	——	2.35
Baltimore, Md.	.....	2.15
Birmingham, Ala.	.....	2.30
Boston, Mass.	.....	2.13
Buffalo, N. Y.	.....	2.20
Butte, Mont.	.90¼	3.61
Cedar Rapids, Iowa	.....	2.24
Charleston, S. C.	.....	2.35
Cheyenne, Wyo.	.82¾	3.31
Cincinnati, Ohio	.58	2.32
Cleveland, Ohio	.....	2.24
Chicago, Ill.	.51¼	2.05
Columbus, Ohio	.57¼	2.29
Concrete, Wash.	.....	2.35
Dallas, Texas	.....	2.00
Davenport, Iowa	.....	2.24
Dayton, Ohio	.58¼	2.33
Denver, Colo.	.66¼	2.65
Des Moines, Iowa	.....	2.05
Detroit, Mich.	.....	2.15
Duluth, Minn.	.....	2.04
Houston, Texas	.....	2.00
Indianapolis, Ind.	.54¾	2.19
Jackson, Miss.	.....	2.50
Jacksonville, Fla.	.....	2.20
Jersey City, N. J.	.....	2.03
Kansas City, Mo.	.....	1.92
Los Angeles, Calif.	.....	2.30
Louisville, Ky.	.55½	2.22
Memphis, Tenn.	.....	2.50
Milwaukee, Wis.	.....	2.20
Minneapolis, Minn.	.....	2.12
Montreal, Que.	.....	1.36
New Orleans, La.	.....	2.20
New York, N. Y.	.....	1.93
Norfolk, Va.	.....	2.07
Oklahoma City, Okla.	.....	2.46
Omaha, Neb.	.....	2.36
Peoria, Ill.	.....	2.22
Philadelphia, Penn.	.....	2.21
Phoenix, Ariz.	.81½	3.26
Pittsburgh, Penn.	.....	2.04
Portland, Colo.	.....	2.80
Portland, Ore.	.....	2.45
Reno, Nev.	.....	2.91
Richmond, Va.	.....	2.24
Salt Lake, Utah	.70¼	2.81
San Francisco, Calif.	.....	2.21
Savannah, Ga.	.....	2.50
St. Louis, Mo.	.51¼	2.05
St. Paul, Minn.	.....	2.12
Seattle, Wash.	.....	2.50*
Tampa, Fla.	.....	2.25
Toledo, Ohio	.....	2.20
Topeka, Kans.	.....	2.41
Tulsa, Okla.	.....	2.33
Wheeling, W. Va.	.....	2.12
Winston-Salem, N. C.	.....	2.62

NOTE—Add 40c per bbl. for bags.
†Delivered on job in any quantity, sacks extra.
‡Less 5c bbl. 10 days.
*Ten cents discount for cash, 10 days. (a) Price includes sacks.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Buffington, Ind.	.....	1.80
Chattanooga, Tenn.	.....	2.45*
Concrete, Wash.	.....	2.35
Davenport, Calif.	.....	2.45
Detroit, Mich.	.....	2.15
Hannibal, Mo.	.....	1.90
Hudson, N. Y.	.....	1.75
Leeds, Ala.	.....	1.85
Mildred, Kans.	.....	2.35
Nazareth, Penn.	.....	1.95
Northampton, Penn.	.....	1.75
Richard City, Tenn.	.....	2.05
Steelton, Minn.	.....	1.85
Toledo, Ohio	.....	2.20
Universal, Penn.	.....	1.80

*Including sacks at 10c each.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	—Plaster Board— ¼x32x 36". Wt. 1500 lb. Per M Sq. Ft.	⅜x32x 36". Wt. 1850 lb. Per M Sq. Ft.	Wallboard, ½x32 or 48". Lgths. 6'-10', 1850 lb. Per M Sq. Ft.
Arden, Nev. and Los Angeles, Calif.	3.00	8.00u	8.00u	10.70u	10.70u	.....	.....	.....	.....	11.70u	.....	.....	.....
Centerville, Iowa	3.00	10.00	15.00	10.00	10.00	10.50	13.50	.....	.....	13.50	.....	.....	.....
Des Moines, Ia.	3.00	8.00	9.00	10.00	10.00	10.50	13.50	12.00	24.00	22.00	18.00	21.00	30.00
Detroit, Mich.	.....	.....	.....	.....	14.30o	12.30m	.....	m9.00@11.00o	.....	.....	.....	.....	.....
Delawanna, N. J.	——	——	——	——	——	8.00	.....	8.25@9.40	.....	.....	.14½s	.15½s	40.00@41.00
Douglas, Ariz.	.....	.....	6.00	.....	.....	.....	15.00	.....	40.00	13.50	35.00	45.00	.....
Grand Rapids, Mich.	2.75	6.00	6.00	8.00	9.00	9.00	17.50	.....	24.55	20.00	.....	.....	.....
Gypsum, Ohio	3.00	4.00	6.00	8.00	9.00	9.00	20.00	7.00	27.00	19.00	.....	15.00	30.00
Los Angeles, Calif.	.....	.....	7.50@9.50	11.50y	.....	.....	.....	.....	.....	.....	.....	.....	.....
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	7.00	30.15	20.00	.....	20.00	30.00
Portland, Colo.	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif.	.....	.....	11.65m	13.40r	14.40r	.....	15.40r	.....	.....	.....	.....	.....	.....
Seattle, Wash.	6.40	11.00	11.00	13.00	.....	.....	.....	.....	28.00	.....	.....	.....	.....
Sigurd, Utah	.....	.....	.....	.....	.....	.....	.....	.....	21.50	.....	.....	.....	.....
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00	.....	.....	.....	.....	20.00	25.00	33.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable).
*To 3.00; †to 11.00; ‖to 12.00; ‡prices per net ton, sacks extra; (a) to 25.00; (b) net; (c) gross; (d) hair fibre; (g) delivered; (h) delivered in six states; (i) delivered on job; (k) sacks 12c extra, rebated; (m) includes paper bags; (o) includes jute sacks; (r) including sacks at 15c; (s) per board; (t) to 16.50; (u) includes sacks; (v) F.O.B. N. Y. C. and dealer's yard in mill locality; (x) Hardwall plaster; (y) sacks 15c extra, rebated.

Market Prices of Cement Products

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point

City or shipping point	Sizes 8x8x16	8x10x16	8x12x16
Camden, N. J.	17.00	.....	.....
Cement City, Mich.		5x8x12—55.00¶	
Columbus, Ohio	18.00@20.00a		
Detroit, Mich.	.16	.....	.18
Forest Park, Ill.	18.00•	23.00•	30.00•
Grand Rapids, Mich.	15.00@16.00a	.....	.....
Graettinger, Iowa	.18@.20	.....	.....
Indianapolis, Ind.	.13@.15†	.....	.....
Los Angeles, Calif.¶	5¾x3½x12—55.00	7¾x3½x12—65.00	
Oak Park, Ill.	18.00	.....	.....
Olivia and Mankato, Minn.	9.50b	.....	.....
Somerset, Penn.	.20@.25	.....	.....
Tiskilwa, Ill.	.16@.18†	.....	.....
Yakima, Wash.	20.00•	.....	.....

•Price per 100 at plant. †Rock or panel face. (a) Face. ‡Delivered. ¶Price per 1000. (b) Per ton.

Cement Roofing Tile

Prices are net per sq. in carload lots, f.o.b. nearest shipping point unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.

Red	15.00
Green	18.00
Chicago, Ill.—per sq.	20.00

Cicero, Ill.—Hawthorne roofing tile, per sq.

	Chocolate, Red, Yellow, Gray and Orange	Green, Blue
French and Spanish†	$11.50	$13.50
Ridges (each)	.25	.35
Hips	.25	.35
Hip starters	.50	.60
Hip terminals, 2-way	1.25	1.50
Hip terminals, 4-way	4.00	5.00
Mansard terminals	2.50	3.00
Gable finials	1.25	1.50
Gable starters	.25	.35
Gable finishers	.25	.35
•End bands	.25	.35
•Eave closers	.06	.08
•Ridge closers	.05	.06

•Used only with Spanish tile.
†Price per square.

Houston, Texas.—Roofing Tile, per sq.	25.00
Indianapolis, Ind.—9x15-in.	Per sq.
Gray	10.00
Red	11.00
Green	13.00
Waco, Texas:	Per sq.
4x4	.60
5x4x12	4.50
5x8x12	8.00
Longview, Wash.	Per 1000
4x6x12	52.00
4x8x12	64.00
Mt. Pleasant, N. Y.:	Per 1000
5x8x12	78.00
Grand Rapids, Mich.:	Per 100
5x8x12	7.00
Houston, Texas:	
5x8x12 (Lightweight)	80.00
Pasadena, Calif. (Stone-Tile)	Per 100
3½x4x12	3.00
3½x6x12	4.00
3½x8x12	5.50
Tiskilwa, Ill.—8x8, per 100	15.00
Wildasin Spur, Los Angeles, Calif. (Stone-Tile)	Per 1000
3½x6x12	50.00
3½x8x12	60.00
Prairie du Chien, Wis.:	
5x8x12	82.00
5x4x12	46.00
5x8x 6 (half-tile)	41.00
5x8x10 (fractional)	82.00
Yakima, Wash.—Building tile:	
5x8x12	.10

Cement Building Tile

Grand Rapids, Mich.	Per 100
5x8x12	8.00

Cement Drain Tile

Graettinger, Iowa—5 to 36 in., per ton	8.00
Olivia and Mankato, Minn.—Cement drain tile, per ton	8.00
Tacoma, Wash.—Drain tile per ft.:	
3 in.	.04
4 in.	.05
6 in.	.07½
8 in.	.10
Waukesha, Wis.—Drain tile, per ton	8.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00@40.00
Baltimore, Md. (Del. according to quantity)	15.50	22.00@50.00
Camden and Trenton, N. J.	17.00	
Ensley, Ala. ("Slagtex")	14.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Friesland, Wis.	22.00	32.00
Longview, Wash.	18.00	25.00@75.00
Milwaukee, Wis.	15.00	28.00@50.00
Mt. Pleasant, N. Y.	14.00	14.00@23.00
Oak Park, Ill.	25.00	a42.00
Omaha, Neb.	18.00	30.00@40.00
Pasadena, Calif.	10.00	.....
Philadelphia, Penn.	14.75	20.00
Portland, Ore.	17.50	25.00@75.00
Mantel brick—100.00@150.00		
Prairie du Chien, Wis.	14.00	22.50@25.00
Rapid City, S. D.	18.00	25.00@80.00
Waco, Texas	16.50	32.50@125.00
Watertown, N. Y.	20.00	35.00
Westmoreland Wharves, Penn.	14.75	20.00
Winnipeg, Man.	14.00	22.00
Yakima, Wash.	22.50	.....

†Gray. ‡Red. (a) Haydenite H. Brick.

Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted.

Culvert and Sewer	4 in.	6 in.	8 in.	10 in.	12 in.	15 in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Detroit, Mich.								15.00 per ton									
Graettinger, Iowa	.04½d	.05½	.08½	.12½	.17½	.....	.40	.50	.60	.70	.....	.....	.....	.....	.....	.....	.....
G'd Rapids, Mich. (b)																	
Culvert pipe	.....	.....	.....	.60	.72	1.00	1.28	1.60†	.....	1.92	2.32	3.00	4.00	5.00	6.00	.....	.....
Sewer pipe (d)	.....	.....	.....	.....	.....	.63	.....	.60†	.....	.....	.....	.58	.....	.....	.....	.....	.....
Houston, Texas	.....	.19	.28	.43	.55½	.90	1.30	.....	†1.70	2.20	.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind. (a)	.....	.....	.....	.80	.90	1.10	1.30	.....	.....	1.70	.....	2.70	.....	.....	.....	.....	.....
Longview, Wash.							Sewer pipe 40% off list, culvert—list										
Mankato, Minn. (b)	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.50	1.75	2.50	3.25	4.25	.....	.....	.....
Newark, N. J.							6 in. to 24 in., $18.00 per ton										
Norfolk, Neb. (b)	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Olivia, Mankato, Minn.							12.00 per ton										
Paullina, Iowa‡	.....	.....	.....	.....	.....	.....	.....	2.25	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Somerset, Penn.	.....	.....	.....	.....	1.08	1.25	1.65	.....	.....	2.50	.....	3.65	4.85	7.50	8.50	.....	.....
Tacoma, Wash.	.15	.18	.22½	.30	.40	.55	.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tiskilwa, Ill. (rein.) (a)	.....	.....	.....	.65	.75	.85	1.10	1.60	.....	1.90	.....	2.25	3.40	.....	5.50	.....	7.78
Wahoo, Neb. (b)	.....	.....	.....	.....	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	4.62	6.14	6.96	
Yakima, Wash.								$10.00 per ton									

30-in. lengths up to 27-in. diam., 48-in. lengths after; (a) 24-in. lengths; (b) Reinforced; (c) Interlocking bar reinforced. (d) Eastern clay, list, 72% and 60% off.

†21-in. diam. ‡Price per 2 ft. length. (d) 5 in. diam. ¹@1.08. ²@1.25. ³@1.65. ⁴@2.50. ⁵@3.85. ⁶@5.00. ⁷@7.50.

Recent Contract Prices

Portland, Ore.—The Santa Cruz Portland Cement Co. was awarded the contract for supplying the water bureau of Portland, Ore., with 200,000 bbl. of cement at $2.77 per barrel delivered at Bull Run station for the large dam of the Bear Creek reservoir project now under way. The first deliveries of approximately 7700 bbl. will be made in July, and other consignments as the material is needed for the work. All cement will be tested by the city bureau of standards.

Newton, N. J.—Board of Freeholders awarded contract for 500 tons of concrete sand at $1.29 per ton to Morris County Crushed Stone Co. and for 3000 tons of trap rock at $1.97 per ton to the Limestone Products Co.

Springfield, Ill.—Bids on 3,600,000 bbl. of cement for state roads opened recently. Reports indicate that prices offered are about 5% below those in 1926.

Onondaga County, N. Y.—Syracuse Wall Plaster Co. awarded contract to supply county with 32,000 bbl. of cement at $2.36 per barrel. Price reported to be 20 cents per barrel less than a year ago.

Sand and Gravel Weights That Must Not Be Off One Per Cent!

ONE PER CENT only of variation from claimed weights is permissible in the sale of sand, gravel, crushed rock and similar materials in the state of Tennessee, and dealers in these commodities will do well to note accordingly, says George R. Langham, sealer of weights and measures for Davidson county. Chapter 35, first extra session of 1913, empowers the state superintendent of weights and measures and the state sealer to "fix and determine reasonable variations" from the absolute weight or measure claimed. They have recently issued a schedule of such permissible variations—technically called "tolerances"—and in that list 1% is made the limit of error tolerated in the case of such building materials. A shortage of more than this makes the seller liable to a fine of from $10 to $50 for the first offense, and $50 to $100 for a repetition. The trial judge may also impose a prison sentence, not exceeding 90 days.—*Nashville (Tenn.) Tennesseean.*

The Lime Convention

BY the time this issue of ROCK PRODUCTS reaches many of its subscribers the White Sulphur Springs convention of the Nationl Lime Association, May 17-19, will be in session. However, it will *not* be too lalte for those who have hesitated up to this moment to pack their grips and hop the next train. It is to be hoped that no live lime manufacturer has put off his decision to attend until this time, but if such is the case he can still go and rarive in time to help take his part in the determination of the future course of the National Lime Association, and very probably of the lime industry.

The association is making an earnest and sincere effort to interest *every* lime manufacturer in this convention, which, as we pointed out in our issue of May 2, is a momentous one for the entire lime industry. Indifference and lack of interest now may be dearly paid for later on. Therefore it is hoped that this late urging will not be necessary.

Golf course green at the Greenbrier hotel, White Sulphur Springs, W. Va.

Missouri Portland Co. to Introduce New Danish Quick-Hardening Cement

WE are informed by H. L. Block, president of the Missouri Portland Cement Co., St. Louis, Mo., that the new quick-hardening cement the company is to manufacture is to be made a process originated in Denmark and known as "Velo." It is a true portland cement and does not use bauxite as the basis.

New Mill to Be at St. Louis

The new mill will be erected adjoining the company's present plant at Prospect Hill, St. Louis county, Missouri, where practically all the raw materials are available. The cost of the new plant will be approximately $2,000,000 and the capacity will be approximately 2000 bbl. per day.

The *Executives Magazine* of St. Louis gives an interview with D. N. Armstrong, general manager of the Missouri Portland Cement Co., from which the following is taken:

"The new process which will be used by the Missouri Portland Cement Co. has been employed in Denmark on a commercial scale for two years. It will be used by our concern by arrangement with F. L. Smidth & Co. of Copenhagen and New York. It was developed by Carl Pontoppidan, a chemical engineer.

"I should like to draw your attention to some laboratory tests which show the very high early strength of the new cement, which we shall market under the trade name of 'Velo.' The accepted method of testing portland cement is to cast it either neat or in various combinations with sand and water into little briquets shaped like a dumb-bell. These briquets after curing in air and water or under varying conditions are put into a machine which grasps them and pulls them in two.

"Under this test for tensile strength ordinary portland cement is supposed to resist a pull of 225 lb. per sq. in. after seven days' time. After 28 days' time ordinary portland cement is supposed to resist a pull of 325 lb. Here is the result of a test on Velo briquets, a mixture of one part of cement with three of sand:

Tensile Strength

1 day—340 lb. 3 days—413 lb. 7 days—432 lb.

"An accepted test for compressive strength is obtained by putting a 3-in. cube of the cement under pressure in a machine. Naturally cement will stand a great deal more crushing force than pull. The following results show test on ordinary portland cement and Velo, both products being mixed in the proportion of one part of cement, two of sand and four of water:

Resistance to Compression, 3-in. Cube

	After 1 day	3 days	14 days	28 days
Ordinary portland	510 lb.	1146 lb.	.....	2588 lb.
Velo	1750 lb.	3304 lb.	5664 lb.	.....

"These tests show the progressive hardening and strengthening as various crystal systems interlock and they also show the great initial strength of our new cement.

"At the end of a year the strength of ordinary portland and the new cement under identical conditions would be about the same. The saving is entirely in time, design of concrete structures not being affected, as would be the case if a greater ultimate strength were secured."

Portland Interests Purchase Control of Idaho Marble Company

ANNOUNCEMENT has been made by H. C. Murphy of the Murphy Timber Co., Portland, Ore., of the acquisition of the controlling interest in the Idaho Marble Co., Lewiston, Idaho, and a reorganization program, under the name of the Oregon-Washington Lime Products Co., with plans for immediately building a rail line from the mouth of Bedrock creek to the milling plant, a distance of 2¼ miles, connecting with the Clearwater branch of the Northern Pacific.

The crushing plant on Bedrock creek was established by H. J. Kressley and A. J. Warren about three years ago. The first plant was destroyed by fire and a new plant with a capacity of 120 tons per day was erected over a year ago. The company has marketed marble chips and limestone and has established market connections in all important centers of Oregon, Washington and British Columbia. In the reorganization plan, Mr. Kressley will remain with the company as sales manager and the operation of the plant will be taken over by Mr. Overdors, recently of Carthage, Mo. The plant will be increased to about 200 tons daily.—*Lewiston* (Idaho) *Tribune.*

C. B. Rogers Leaves Reliance Rock Co. to Return to Atlas Portland Cement Co.

THE Southern California Rock Products Association announces the resignation of its past president, Clinton B. Rogers, who has been manager of the Reliance Rock Co. since that company entered this field as a large producer of sand and gravel three years ago. Mr. Rogers is returning to the cement industry, in which he is well known throughout the country, and will have charge of western sales for the Atlas Portland Cement Co. at Chicago. Joseph Rittler will succeed Mr. Rogers as manager of the Reliance Co., Los Angeles, Calif.

A farewell dinner was given by the rock products producers to Mr. Rogers at the Jonathan Club, May 3, in appreciation of his active interest in the industry and its association.

Myers Company to Open New Gravel Plant

THE Myers Sand and Gravel Co., Anderson, Ind., has acquired a tract of 16 acres of land directly south of the Big Four tracks, at the intersection of the eastern and southern divisions of the Big Four, near the south yards, and will establish a new gravel plant. Equipment to be installed includes screening and washing machinery.

Linfield Myers, head of the company, states that the tract will be developed at once, the pit to be worked to a depth of about 35 ft. for the south section of the city.

National Quarries to Resume Operations

THE National Quarries Co. is to resume operations at its Lima, Ohio, property, according to a current report in the *Lima* (Ohio) *News*. The quarrying of stone had ceased pending the disposition of an injunction secured by the D. T. and I. railroad, approximately 10 acres of land sought for the establishment of terminal and storage tracks being affected. Attorneys for the railroad secured a vacation of the restraining order which had been in effect over the National company's operation for some time.

Melvin Light, attorney for the railroad, said that pending determination of condemnation proceedings the company had decided to no longer prevent the quarries company from the operation of its property, and to permit the use of the lands already excavated for laying tracks to give the quarries company access to land owned just east of the involved tract, connecting it with the main quarry property on the west side of the present railroad right of way.

At the time the injunction was granted last year by Judge Henry W. Blachley, Van Wert jurist, the railroad company was required to post a $1,000,000 bond to cover possible damages to the National Quarries Co. for losses sustained if, in the end, it is found the injunction was wrongfully obtained.

A surety bond in that amount was filed by the railroad and is now in effect. What if any bearing this has on the action of the road in seeking a modification of the injunction is not known.

Officials of the National Quarries Co. claim the injunction prevented the quarrying of 300,000 tons of stone last season, that would have required the employment, night and day during the season, of 50 men.

While it was stated that attorneys for the railroad would go before Probate Judge Jesse H. Hamilton, Friday, and ask to have its appropriation case against the quarries company assigned for trial, the order had not been requested at the time of the report.

Wisconsin Granite Buys Quarry at Rowena, S. D.

PURCHASE of 160 acres of land near Rowena, S. D., by the Wisconsin Granite Co., which plans to expand its quarrying operations, is reported in the *Sioux Falls* (S. D.) *Argus Leader*. The deal is said to have been in process of negotiation for a year and a half, but owing to the sickness and subsequent death of J. J. Sloan, general manager of the company, it was unavoidably held up. The land was purchased from Mrs. Ruby Webb and is the southwest one-quarter of section 26, township 101, range 48, Minnehaha county.

It is the intention of the company, as an initial proposition, to invest in equipment and improvements $150,000 in this plant. The machinery and equipment will all be new and up to date. The company's plant at Sioux Falls will be operated in connection with the new plant to its fullest capacity.

The demands and contracts the company has for the Sioux Falls jasper, as crushed stone, is said to be so great that an expansion of operations was necessary. An attempt was made to get land nearer Sioux Falls because of the living conditions for employes and better railway facilities, but this was impossible, so the Rowena property was purchased.

It is estimated that the new plant will be able to turn out approximately seven or eight times as much stone as the present plant. The great majority of the stone shipped by the company goes to Chicago and other cities served by the Illinois Central railway, and where it is necessary to ship over other roads arrangements have been made for the transfer of cars. During the past 15 years the plant has been in operation the company assisted very materially in the progress and upbuilding of the city. Approximately 50% of the output of stone from the Sioux Falls quarry has been paid to labor producing it. Upon the death of Mr. Sloan, Walter S. Primley, the president, took charge of the company's business and is personally actively engaged in the affairs of the company.

The company, after a full investigation, and in view of past events, decided to place their new plant away from the houses and buildings, so that the shooting of their blasts would not in any manner interfere with buildings and residences tributary to the plant. The company has been put to many annoyances in the past four or five years by parties complaining of injury to their property by reason of shooting blasts in the Sioux Falls plant, it is said. A few of these complaints were well founded, but the majority of them were simply to annoy the company and obtain a little easy money, the report states.

Volunteer Portland Purchases Site for New Knoxville Cement Mill

SEVENTY acres of land near the John Sevier yards at Knoxville, Tenn., are reported to have been purchased by the Volunteer Portland Cement Co. as a site for a new cement mill. The consideration was given as $44,100.

Major F. H. Lewis, who has been retained as consulting engineer for the company, is busy completing plans for the machinery and equipment of the proposed works and will soon assemble the engineering staff for the project. Contracts for machinery have not as yet been let, the report states, the different manufacturers products still being under consideration.

The Volunteer Portland Cement Co. was organized recently at Knoxville, Tenn., by a group of local business men headed by Howell J. Davis, who became the vice-president of the company. Earlier information on the company appeared in ROCK PRODUCTS, March 19 and April 22 issues.

Michigan State Cement Plant to Continue Operations

MICHIGAN will continue to manufacture cement at its prison plant at Chelsea "to provide labor for prisoners and to equalize the price of cement," Gov. Fred W. Green is quoted in the *Albion* (Mich.) *Recorder*.

"Even if it should show a loss," the governor added, "and yet definitely tended to equalize the cost of cement for the state's highway projects, I believe it would be folly to abandon the plant."

The entire output of the plant, to be produced on a new basis under "more efficient management," will be used for the construction of Michigan roads, he said.

The governor's announcement terminated months of uncertainty over the probable fate of a controversial piece of state property acquired in 1923 by the administration of Gov. Alex J. Groesbeck at an initial cost of $500,000.

It figured largely in the last gubernatorial campaign in which Green defeated Groesbeck by a majority of 150,000 votes in the primary. The governor charged the plant was a "white elephant" on the hands of the state and that it had "lost money." Groesbeck replied by asserting it had "made money."

One of Governor Green's first acts after assuming office was to order an appraisal by C. H. Sonntag, a cement engineer, which revealed an alleged over-valuation. An auditor's report has not been submitted, but the governor said recently the work is still progressing.

"We have reorganized the entire plant and are starting out with a clean slate," the governor said. "We have accepted Mr. Sonntag's appraisal as a basis and will work out what we can from that. Operating costs have been reduced to a minimum and the output will be fixed at an efficient level."

Although the plant has a reputed annual capacity of 750,000 bbl., the production may not be extended to that point, the governor intimated. He made it clear, however, that he considered not the least use of the plant would be a "club" over the heads of private operators who might attempt to drive a hard bargain with the state.

To Build Texas Crushing Plant

MACHINERY and equipment for a large crushed rock and stone quarrying plant will be installed near Tascosa, Tex., by A. N. Spencer, of Amarillo, and associates. The plant, it is said, will have a capacity of 15 cars of crushed stone a day and a large quantity of white building stone. It will be located adjacent to the Fort Worth and Denver railroad and will give employment to about fifty men. The large demand for building materials in Amarillo, 20 miles distant, and in other rapidly growing towns of the Panhandle district of Texas, led to the establishment of the new industry.

Duluth Gravel Plant Starts Operation

WHITNEY BROS. CO., new sand and gravel plant, recently completed at Duluth, Minn., is reported to have started operation. The plant is one of the largest in the middle west and will become, it is said, the headquarters for the company.

The plant is built at the edge of the bay front and offers excellent tracking and boat transportation facilities. A slip deep enough to allow the average lake freighter to dock has been provided. A dock has been extended 500 ft. out into the bay to be used for storage of the gravel and sand. The plant will be able to wash about 5000 yd. of gravel a day.

The plant will become the northwest distributing headquarters of the Whitney Bros. firm and will offer an opportunity to be within close distance of the large rock crushing plant owned on the boulevard.—*Duluth* (Minn.) *Tribune.*

Gypsum Beds at New Mexico to Be Developed

PARTIES said to be interested in cement and other industries have filed on nearly two townships of gypsum sands just west of Alamogordo, N. M., according to a recent report in the *Albuquerque* (N. M.) *Journal.* Names appearing on the filing list include O. P. Ady, H. E. Lindas, J. W. Ady, Jr., Jesse Lindas, H. P. Ady, John Lindas, Jr., Marta L. Pribble and E. S. Edgerton, all of whom are said to live in the Cripple Creek and Victor sections of Colorado.

The areas designated are in townships 15, 16, 17 and 18 south and range 7 and 8, east, covering the best part of the so-called white sands. Chemical tests show that the material in this section runs from 93 to 97% pure gypsum, the report states.

Joseph W. Ady, a member of this group and a leading mining engineer of Colorado, has made a careful investigation of local conditions here. He and Dr. Lindas have investigated the fuel and power possibilities and are discussing the matter of freight rates with Southern Pacific officials. A reasonable rate for power will be given by the new Texas-Louisiana Power Co., it is said.

If the new company's plans work out as they now anticipate, this 176,000-acre area, said to be the largest body of pure gypsum in the world, will be tapped with an electric railway and connected up with other commercial activities of this section.

A brief description, including illustrations of these beds, was published in ROCK PRODUCTS, June 12, 1926. According to information furnished at that time by the Southern Pacific railway, these deposits cover about 270 sq. miles and run about 33,000,000 tons per sq. mile. The gypsum sands form dunes and high drifts just as ordinary sands in desert winds. They are on government lands and claims have been repeatedly filed, but no work has been done on them, so they have reverted back to the government. The principal reason for their non-development appears to be that gypsum is rather plentiful in New Mexico and other deposits nearer towns water and transportation have been exploited.

Southern Silica to Increase Capacity

PLANS are reported to have been made whereby the capacity of the two pits worked in Lexington county, S. C., by the Southern Silica Milling and Manufacturing Co. will be increased from 60 to 75 cars per day. The company produces several grades of sand for various purposes, shipping to many of the southern states.

The Southern Silica Milling and Manufacturing Co. was established in 1919. It operates two large sand pits, both in Lexington county, one located at Ehrlich's siding, near Dixiana, on the Seaboard Air Line railroad, and the other at Summit, on the Southern railway. The Dixiana pit has a capacity of 25 carloads a day and the one at Summit a capacity of 35 carloads a day. Sand for the state highways of North Carolina, South Carolina, Tennessee and Georgia is furnished from these pits.

At the pit located at Summit a high grade of dried and screened filter sand is manufactured, of which one grade is used in municipal filter plants to purify the water supply and another grade is used in bleachery processes, which require quick water filtration.

This filter sand has been shipped to 11 southern states and to Cuba.

At the Dixiana plant a sand dryer has been installed with a capacity of over 100 tons daily, from which dry sand is shipped to numerous manufacturing plants which require a dry product.

John G. Ehrlich of Columbia is president and treasurer and H. E. Wells, vice-president and general manager. The Columbia office is located at 1226 Sumter street.—*Columbia* (S. C.) *Record.*

Montana Gravel Plant Busy on Large Ballast Order

BALLAST gravel for 40 to 50 miles of the main line of the Northern Pacific on the Yellowstone division will come from the Grant Smith Co.'s gravel plant at Edgar, Mont., this year, according to G. N. Martin of the Grant Smith Co.

The plant started operations April 6 and notwithstanding the stormy weather of recent weeks it has run virtually without any let-up since that time, Mr. Martin said. The company is operating under a contract with the Northern Pacific, which calls for 1,000,000 yd. of gravel. Specifications call for crushed and washed ballast gravel with which the entire main line of the road is to be improved, Mr. Martin said.

The Edgar plant is employing a force of 45 men.—*Billings* (Mont.) *Gazette.*

Kansas City Quarries in Merger

THE merger of nine crushed stone companies in Kansas City, Mo., western Missouri and eastern Kansas under the name of the Consumers Material Co., is announced.

Authorized capital of the new company is $1,500,000 of preferred stock and 17,000 shares of no par common stock. The William R. Compton Co. of Chicago, Ill., and St. Louis, Mo., has underwritten $550,000 of 6½% sinking fund gold bonds.

Organized under the laws of Delaware, the Consumers Material Co. has taken over 17 rock crusher plants owned and operated by the nine companies.

R. Newton McDowell, president of the Consolidated Crushed Stone Corporation, 611 Pioneer Trust building, was one of the leaders in the merger and becomes president of the new company; W. M. Spencer, vice-president; H. P. Thomson, vice-president; L. R. Peairs, secretary and treasurer; J. F. Rhodes, general superintendent.

The nine companies involved in the merger are the American Rock Crusher Co., Atlas Crushed Rock Co., Consolidated Crushed Stone Corp., Kansas City Quarries Co., W. M. Spencer Co., Clay County Crushed Rock Co., the quarry owned by W. A. Ross Construction Co., Thomson Bros. Rock Co. and Twyman Crushed Rock Co.

Because of the wide distribution of the 17 plants in the Kansas City territory, the new company will have the advantage of being able to obtain single-line freight rates on eleven railroads serving the territory. This will mean a saving of about 30 cents a ton on average shipments.

The Consumers Material Corporation has a number of contracts for supplying crushed rock, among which is the contract to supply all crushed rock in western Missouri for Missouri state highways.

General offices of the company will be maintained at 611 Pioneer Trust building.

In addition to the above named officers, the board of directors will consist of John Prince, president of the Stewart Sand Co., W. D. Boyle, president of the Halpin-Boyle Construction Co., and E. W. Sloan, vice-president of the William R. Compton Co., investment bankers, St. Louis, Mo., and Henry H. Hopkins, president of the American Trust Co., St. Louis, Mo.

Convention Proceedings of the Sand-Lime Brick Association Now Available

THE complete transactions of the twenty-third annual convention of the Sand-Lime Brick Association held at Detroit, Mich., on February 1, 2, 3, 1927, are now available in printed form to association members upon application to Ellen Knight, secretary, Hummelstown, Penn. It contains among other things the officers' and committee reports. Some of the papers reprinted in full in the booklet have appeared in abstract in ROCK PRODUCTS, February 5 and 19 issues.

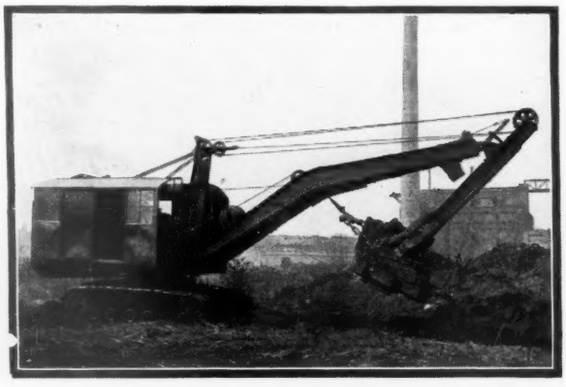
New Machinery and Equipment

Trench Hoe With the Goose-Neck Boom

A TRENCH hoe equipped with goose-neck boom has been designed by the Harnischfeger Corp., Milwaukee, Wis. It is of possible interest to rock products producers as a new stripping device. This improved hoe is one of eight attachments which can be used on these machines. The goose-neck boom permits digging to a greater depth than is possible with the old straight type of boom.

The model 700 trench hoe, as illustrated, digs to a depth of 24 ft. and has a working reach of 36 ft 6 in., it is claimed.

The Harnischfeger Corp. is equipping its 1-yd. and 1¼-yd. machines with this improved type of boom. The 1-yd. machine, model 600, with dipper teeth adjustments, cuts trench from 38 to 42 in. in width. The 1¼-yd., model 700, cuts trench from 46 to 52 in. in width. Any width of trench beyond 52 in. can be cut by shifting the course of the dipper. The dipper can be dumped from the front or bottom, and the dipper door is provided with a special patented locking device.



Trench hoe with goose-neck boom

Performance Records of High Alumina Linings of Cement Kilns

SUPPLEMENTING an article published in Rock Products, February 20, 1926, on the performance records of cement-kiln linings of high alumina firebrick made by the General Refractories Co., Philadelphia, the following data is offered by the same manufacturer, whose product is sold under the trade name "Arcofrax." Quoting a letter from the general superintendent of the cement company:

"The effect of shutdowns on the life of the fire clay brick linings formerly used and on the 'Arcofrax' linings now used is the same, in that it shortens their life, but in the case of 'Arcofrax' they will stand up under double the number of shutdowns before renewal is essential."

In kilns Nos. 1, 3 and 4 of the plant referred to above, high alumina brick linings have given 12 months or more actual operating service (exclusive of shutdown time).

The lining of kiln No. 2 had been in service a year, with six shutdowns each of 12 hours or longer, when the kiln was shut down for annual plant repairs. The entire lining was in such condition that it would have run considerably longer. At this writing the greater part of the original lining put in this kiln in January, 1926—14 months previously—is still in service.

Following is the cement company's official experience record with the four kilns lined with the high alumina brick known as "Arcofrax":

Kiln No. 4

Lined August 27, 1925. Relined December, 1926. During that time lining was subjected to four shutdowns, each of 30 hours or more, as follows:

October 27, 1925.
December 21, 1925.
February 1, 1926.
April 26, 1926.

December 3, 1926, hot zone relined.

Kiln No. 1

First lined September 14, 1925. Relined December, 1926. During that time lining was subjected to six shutdowns, each of eight hours or more, as follows:

October 11, 1925.
January 19, 1926.
April 5, 1926.
August 6, 1926.
August 10, 1926.
August 27, 1926.

December 13, 1926, hot zone relined.

Kiln No. 3

Lined October 7, 1925. Relined October, 1926. During that time lining was subjected to seven shutdowns, each of 12 hours or more, as follows:

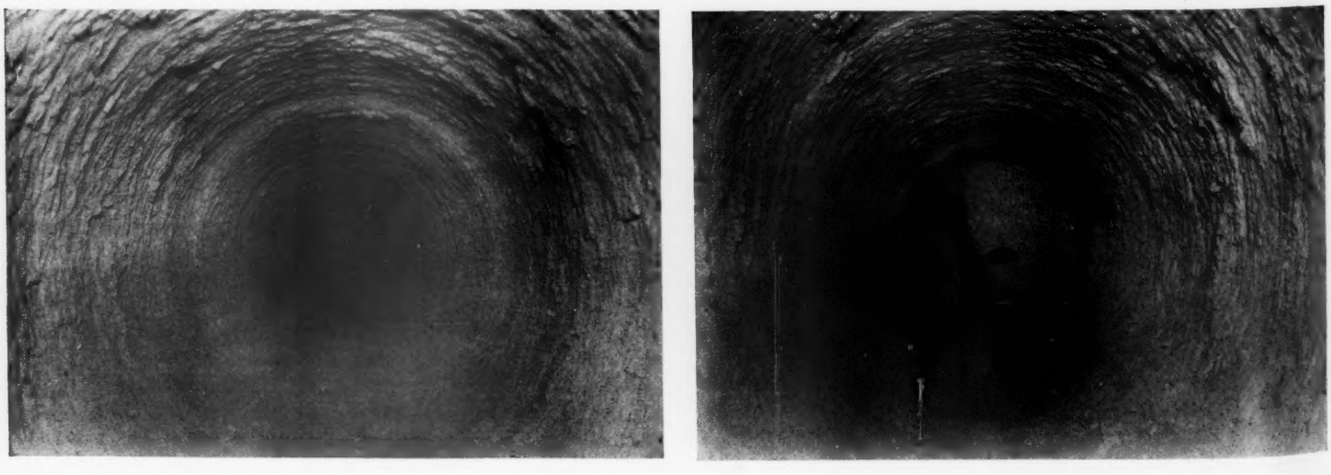
October 7, 1925.
October 31, 1925.
February 26, 1926.
April 19, 1926.
August 1, 1926.
August 24, 1926.
October 18, 1926.

December 15, hot zone relined.

Kiln No. 2

Lined January 7, 1926. The lining still in service has already been through six shutdowns, each of 12 hours or more, as follows:

April 5, 1926.
July 13, 1926.



Illustrating the condition of a high alumina lining in a rotary cement kiln after a 14-month run

August 1, 1926.
August 7, 1926.
November 19, 1926.
December 14, 1926.

February 8, 1927, kiln returned to service with same hot zone lining.

In no case were the high alumina brick linings the cause of the shutdowns mentioned.

Small Convertible Power Shovels

TWO new small capacity power shovels of the full-revolving type have been recently brought out by the Northwest Engineering Co., Chicago, Ill. The new models, called No. 2 and No. 3, of ½-yd. and ¾-yd. capacity, respectively, are both convertible to crane or dragline on 35-ft. boom.

The same features of construction in the larger Northwest models 104 and 105 are said to be included in these two new shovels. The No. 2 machine is equipped with a four-cylinder Winconsin motor capable of developing 48 hp. and the No. 3 machine has a larger motor of the same make developing 56 hp. at 800 r.p.m. Electric motors of suitable capacities may be provided if desired.

Small power shovel of full revolving type

Small Material Conveying Truck

THE Home Chain Co., Muskegon, Mich., has recently brought out a small three-wheeled truck for use as a material conveyor, handling loose, bulk, package or heavy piece equipment up to three tons in weight. The "Jak-Tung," as it is called, consists of a platform equipped with two malleable iron wheels at the rear and a malleable iron draw bar in the front. The jack tongue, from whence the truck takes its name (with wheel), hooks into the draw bar leg and, by a downward thrust of the handle, the load is raised and may be hauled anywhere.

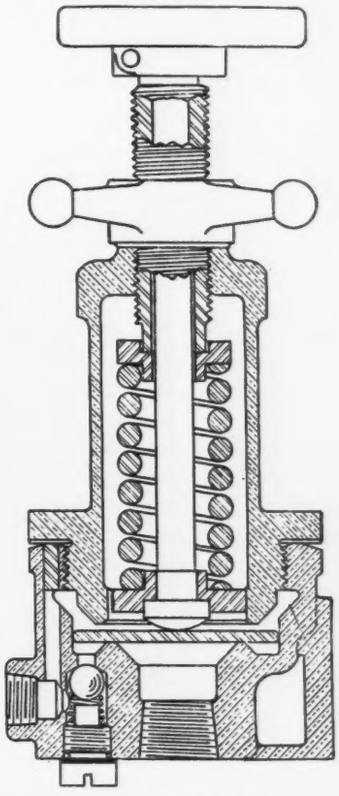
It is declared that trains of eight or ten of these trucks, together with a tractor, will wind around machines, turn sharp corners, negotiate narrow pathways, and in other ways function efficiently and "track" perfectly in congested quarters. In this way more flexibility is given to plant operations, it is said, and since the materials are kept on wheels from one operation to another, the handling costs are considerably reduced.

The "Jak-Tung" is built in 17 sizes and 3 models, with either steel or hardwood platforms or trays in varied combinations. The model shown is said to be especially suitable for hauling sacked lime, cement, etc., to any from storage or to delivery trucks. With a suitable tray, the truck can be used to carry bulk lime, gypsum, cement, etc.

Improved Unloader for Pneumatic Air Compressors

THE Chicago Pneumatic Tool Co., New York, has recently brought out an improved differential unloader with which all its pneumatic air compressors are now equipped. Among the advantages claimed for the new "Sunplate" control valve are elimination of auxiliary unloader by which unloader piping is simplified, more sensitiveness in operation due to absence of close fits, wider application of pressure ranges. Ease of installation, cleaning and servicing and inexpensive repairing.

The valve is a single plate of stainless steel ground to a flat surface. The diameter is also ground to fit the cap with a few thousandths clearance and the edge is well rounded to prevent its sticking as a result of cocking on its seat. The cap contains a ball check valve spring and ball check screw. The flanges by which the unloader is attached to the compressor or panel are on the cap. This permits dismantling the unloader for examination or cleaning without disturbing the piping or valves. The device is said to operate with a 5-lb. range between unloading and loading the compressor. An unloader is set to unload generally with 100 lb. and the reloading pressure is 5 lb. lower.

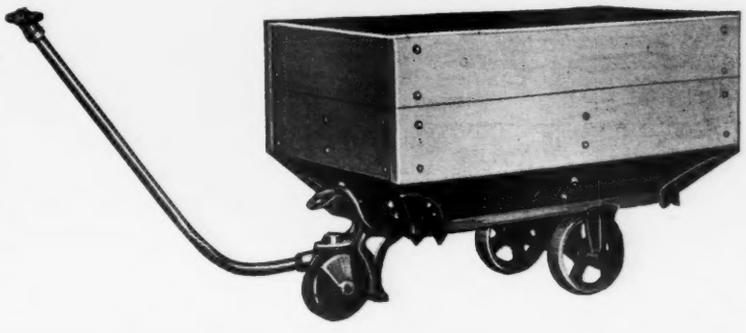


Differential unloader for air compressors

The unloader is now built for standard pressures from 50 to 125 lb.; for low pressure work of 40 lb. or less; and for high pressure work up to 500 lb.

Wisconsin State Cement Plant Bill Killed

ASSEMBLYMAN COLEMAN'S bill, providing for an investigation of the feasibility of erecting a state cement plant in Wisconsin, was killed by the state assembly at a recent hearing.



Three-wheeled truck with tray for handling materials about plants

News of All the Industry

Incorporations

Jackson Mica Corp., Wilmington, Del., $100,000. Deal in all kinds of minerals.

M. O. Wilkins Corp., Wilmington, Del., $1,100,000. Deal in all kinds of minerals.

Crystal Sand Co., Mission, Texas, $25,000. By E. A. Showers, J. D. Brock and W. H. Wood.

Middlesex Concrete Products Co., Arenel, N. J., $125,000. To manufacture concrete products.

Southern Gravel Co., Inc., Alexandria, La., $25,000. By W. C. Easton, O. H. Lewis and Harry F. Bush.

Hudson Sand Co., Newburgh, N. Y., $50,000. (By Alexander & Ash, 79 Wall St., Manhattan, N. Y.)

Brookhurst Sand and Gravel Co., Asbury Park, N. Y., $125,000. By Edwin P. Longstreet of Asbury Park.

Universal Sand and Gravel Corp., New York City, N. Y., 100 shares of common stock. By L. Oppenheimer, 60 Wall St.

Belanger Cement Works, Limited, Montreal, Canada, $20,000. To manufacture and deal in cement and its by-products.

Western Pit and Quarry Co., Inc., Sioux City, Iowa, $200,000. Deal in sand, gravel and stone. By Hubert Everist.

Superior Sewer Pipe Co., Greenville, S. C., is reported to have increased its capital stock from $46,000 to $85,000. C. R. Johnson of Camp Sevier is president of the company.

Illinois Slag and Ballast Co., Chicago, Ill., reports increase in its capital stock from $300,000 to $500,000. (Correspondent: Knapp & Campbell, 208 S. La Salle St.)

Oregon Lime Products Co., Portland, Ore., $100,000. By A. A. Muck, T. B. Neuhausen and Arthur I. Moulton. (Correspondent: Lord & Moulton, 1107 Spalding Bldg., Portland.)

Union Gravel Corp., New York county, N. Y., $300,000. To quarry, mine, dig, manufacture, etc., cement, gravel, brick, marble, etc. By J. T. Aspbury, 120 Broadway, New York City.

Lime Hydrate Co., 217 Broad St., Elizabeth, N. J., $125,000. Deal in lime products, mason materials, etc. By Harry J. Fromm of Roselle, Wm. H. Stinemire and Jennie C. Clark of Elizabeth. (Attorney, John Miller, Elizabeth.)

Walling Concrete Products Co., Asbury Park, N. Y., $125,000. Deal in sand and gravel. By Edgar R. Walling, Almira F. Walling and Daniel W. Taylor, all of Asbury Park. (Attorney, Edwin P. Longstreet, Asbury Park.)

Hydro Building Block Corp., Grand Rapids, Mich., $25,000 and 500 shares of no par value common stock. To engage in the manufacture of special building blocks. By Frank C. Hotelling, Edward W. Hill, James Well, all of Grand Rapids.

Sandgrav Realty Corp., Cranston, R. I. Capital stock 500 shares common, no par value. Will manufacture brick, cement, etc. By E. Butler Moulton, Cranston; Stuart Tucker and Warren T. Frohock.

Ameriver Sand Co., Reno, Nev. The capital stock consists of 10,000 shares of preferred stock at $10 per share and 200,000 shares of no par common stock. Deal in sand, gravel, crushed rock and building materials.

Cement

Lehigh Portland Cement Co. was the host recently at a banquet given for the cement block manufacturers of Columbus, Ohio. Following the dinner, H. C. Shields of the service department gave a talk on "Success in Manufacturing and Merchandising Concrete Products."

Alabama Portland Cement Co., North Birmingham, Ala., a subsidiary of the International system, will soon begin developing the limestone and shale deposits at St. Stephens on Tombigbee river north of Mobile, the product to be used in the new mill at New Orleans.

Dewey Portland Cement Co., Davenport, Iowa, has moved its executive offices from the seventh to the third floor of the Union Savings Bank Bldg. Permanent sales offices have also been opened here and rapid progress is reported on the company's new plant near Buffalo, operation to start about June 1.

Lehigh Portland Cement Co., Allentown, Penn., has put out an interesting bulletin, "High Early Strength Concrete," in which the methods, aggregate and costs are discussed in detail. Several interesting charts are also given to illustrate the three important factors: Long mixing time, low water content and increased portland cement content.

Georgia Portland Cement Co. recently organized by a group headed by J. L. Hankinson, Augusta, Ga., to build a cement mill near Sandersville, Ga., has established an office in the Candler Bldg., Atlanta, Ga. An 827-acre deposit of limestone is reported to have been purchased and tentative plans for a mill of 1,000,000-bbl. annual capacity have been drawn up, it is said. Surveys of the property are said to have been made by the H. K. Ferguson Co., Cleveland, Ohio.

Gypsum

Ebsary Gypsum Co., Newark, N. J., recently had their storage and shipping office building at 414 Ogden St. damaged by fire.

Northwest Gypsum Products Co., Seattle, Wash., announces its new address as 401-2 Walker Bldg. The general offices at Lewistown, Mont., have been discontinued. The mill office will be maintained at the plant at Gypsum, Mont.

Quarries

New York State Highway Department is said to have recently re-leased the quarry at Kingston, N. Y., for a term of three years. The department has been quarrying and crushing stone there for the past six years, hauling it by motor trucks for state highway repairs throughout the county.

Jasper, Minn., reports that the three quarries located there have started operations.

Ellis Park Stone Co. and **Hawkeye Quarry Co.** are said to have been recently purchased by S. P. Moore, president of the Builders' Material Co., 601 S. 3rd St., Cedar Rapids, Iowa.

American Rock Crusher Co., Kansas City, Mo., is planning to build homes on the site of its old quarry operation, it is stated.

Crystal River Rock Co., Crystal River, Fla., is reported to be making extensive improvements to its plant, at a reported cost of $120,000. The daily output has been increased from 1000 to 4000 ton. G. L. Abbott is general manager of the plant.

Batesville Marble and Quarries Co., Pfeiffer, Ark., is reported to have recently shipped an order of marble to Cuba. It is to be used in the construction of the new Cuban capitol.

St. Lawrence Marble Quarries, Gouverneur, N. Y., have been purchased by J. J. Sullivan of this place, who will install some modern machinery for manufacturing cut stone.

Sand and Gravel

Edward Arp of Milwaukee, Wis., has leased the sand and gravel property of Robert Maas in Germantown. A crusher and other equipment will be installed soon.

Crescent Gravel Co., Hersey, Mich., has opened a new gravel pit at Beulah. Construction of a siding has been started and operation is to begin about the middle of this month. The product is to be used by the Wabash railway for ballasting.

Hazelton Gravel Co., Princeton, Ind., has appointed Henry P. Phillips of Princeton the receiver for the company.

Dansville, N. Y., is reported to have recently purchased a gravel pit.

Concord, Mich., recently leased its gravel pit to the Jackson County Road Commission for a reported term of 15 years. The gravel remaining in the Homer St. pit was sold for $550, it is said.

Warren, Wells County, Indiana, has found a deposit of gravel of good quality which will be used on Huntington county roads, according to W. E. Rogers, county road superintendent.

Star Sand Co., Portland, Ore., dealing in sand, gravel and crushed rock products, has moved its offices from the Board of Trade Building to 525 River St.

Norfolk Sand and Gravel Co., City Point, Va., has begun operation. A small steam shovel is being used to load cars while the derrick is being completed.

Boice Bros., Pontiac, Mich., report the purchase of new equipment for increased production, at their gravel pit here. They have also just completed a new office building and have added a complete line of building materials, with the exception of lumber, to their stock.

Ocean Stone and Gravel Co. of Tampa, Fla., recently received a cargo of gravel from Baltimore, Md., on the steamship "Catherine Weems."

Construction Materials Co., Chicago, Ill., Diesel operated dredge "Sandcraft" has left its winter docks at Ferrisburg, Mich., to open its regular season of excavating sand and gravel from the bottom of Lake Michigan. The dredge has been completely overhauled and refitted for the heavy season. The "Sandcraft" is a sister ship to the "Sandmaster," also owned by the same company.

Silica Sand

Cape Silica Co., Cape Girardeau, Mo., with its main office at 263 S. Schuyler Ave., Kankakee, Ill., plans the erection of a new mill of fireproof construction throughout, to include storage sheds, warehouses, tool and machinery buildings, storage bins, large drying house and crushing house, all connected with the main building, containing a battery of pulverizers.

Lime

Hoosac Valley Lime Co., Howland Ave., Springfield, Mass., has plans for the erection of several buildings, new kilns and other equipment to develop about four times its present capacity. Power machinery and other equipment will also be installed at its limestone quarries near the plant. The entire project is reported to cost over $125,000.

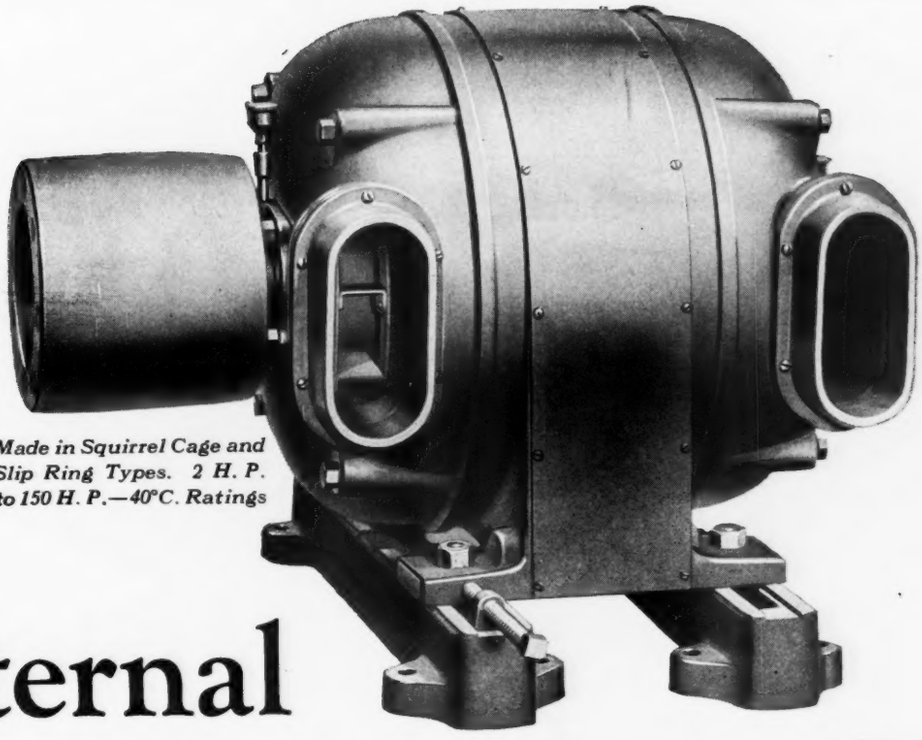
Limestone Products Co. of Ocala, Fla., will open a new plant near Santon, Fla., it is rumored.

San Bernardino, Calif., reports that Briant S. Young of Los Angeles and U. J. Roberts of Alhambra recently purchased six limestone claims near Devore. The new owners plan to erect a lime plant with a 300 bbl. per day capacity.

Port Byron, Ill., Lime Association plant has been sold to the Fidelity Title and Finance Co. of Davenport, Iowa. New and improved equipment will be installed in the near future, it is stated.

Agricultural Limestone

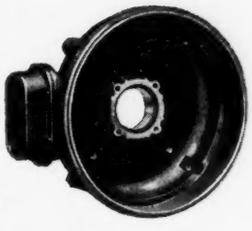
Forsythe, Mo., reports, through the district agricultural extension agent, George L. Hawn, a notable increase in the number of inquiries regarding the purchase of agricultural limestone for soil conditioning by the farmers in this district. He also states that the Ash Grove Lime and Portland Cement Co. of Galloway, Mo., has quoted prices on the product.

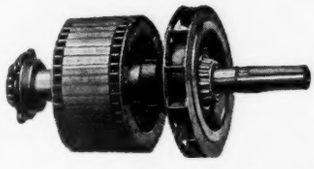


Made in Squirrel Cage and Slip Ring Types. 2 H. P. to 150 H. P.—40°C. Ratings

Internal Protection at Low Cost

Inlet and outlet manifolds can be located independently of each other, in any 90° position to suit plant layout. Free circulation of clean, cool, dry air, under precise control is assured.





The powerful shrouded fan is capable of drawing ventilating air through long pipes and discharging at same distance if necessary. The compact Timken mountings promote effective application of air.

PRICES ONLY SLIGHTLY HIGHER THAN STANDARD OPEN TYPE MOTORS

Dirt, corrosive gases or other destructive agents cannot get in to harm these highly protected self-ventilated Allis-Chalmers motors. Fire hazards also are overcome.

The bearings themselves are the most highly wear-resistant in use today—Timken Bearings, with full thrust and shock capacity, as well as greater radial capacity—free from all possible friction—running months at a time on the same grease—and permitting refined, compact construction.

Allis-Chalmers electric steel frames, indestructible rotors, extra-sealed insulation and other characteristic superiorities also contribute to permanent endurance and economy.

Never has every possibility of motor wear been so completely canceled. Plant efficiency goes up accordingly wherever these motors are installed. They show again why Allis-Chalmers motors command consideration in every motor purchase today.

ALLIS-CHALMERS MANUFACTURING CO., MILWAUKEE
District Sales Offices in all Principal Cities

ALLIS-CHALMERS MOTORS

When writing advertisers, please mention ROCK PRODUCTS

Talc

Whiskeytown, Shasta county, Calif., reports that a carload of talc was recently shipped from the Ganim mine, near here, to New York for testing purposes.

Personals

Robert H. Noble, president of the Ohio River Sand and Gravel Co., has been appointed by Mayor J. N. Bailey of Paducah, Ky., to serve as a member of the Paducah Park Commission.

H. W. Hardinge, president of the Hardinge Co., New York City, sailed recently for Europe. He will be absent about six or eight weeks on foreign business.

Ross Farra, head of the industrial relations department of the American Gypsum Co., Jersey City, N. J., will become secretary of the Grand Rapids, Mich., safety council on June 1.

Lawrence H. Whiting, chairman of the board of directors of the Indiana Limestone Co., Bedford, Ind., recently addressed the Bedford Rotary Club members on the progress made by his company since its organization about a year ago.

R. L. Vance, for the past 17 years connected with the California Portland Cement Co., has recently been appointed as assistant to the president of the Union Rock Co. of Los Angeles, Calif.

W. J. Van Valkenburg, for the past year connected with the Reliance Rock Co. and for six years previous with the Blue Diamond Co., has been appointed sales manager of the Union Rock Co., Los Angeles, Calif. Mr. Van Valkenburg succeeds Walter Moore, Jr., who has become sales manager for the Consumers Rock and Gravel Co.

Harold H. Hess, secretary and treasurer of the Lansing Sand and Gravel Co., Lansing, Mich., for the past year, has retired from his position as director of the company to enter into the insurance business.

George H. Cox of the Westinghouse Electric and Manufacturing Co., who has been New England manager for the past eight years, has been appointed sales manager at the South Philadelphia Westinghouse works, in charge of the sales of all the products manufactured at that plant, including steam turbines, condensers, Diesel engines, etc. He entered the employ of the Westinghouse company in 1912 as a supply salesman in the Boston office. In 1915 he was promoted to manager of the supply division of that office. He held this position until 1919, when he was appointed district manager with headquarters at Boston. He acted in this capacity until his recent appointment to sales manager of the South Philadelphia works.

J. P. Alexander of the Westinghouse Electric and Manufacturing Co. has recently been appointed Boston manager in charge of all sales and service in New England. During the twenty years that he has been associated with Westinghouse, Mr. Alexander has become a prominent figure in the electrical industry in New England and has gained a wide experience which makes him particularly fitted for the responsibilities of his new position. He graduated from Lafayette in 1907 with the degree of Electrical Engineer and enrolled in the Westinghouse apprentice course at East Pittsburgh in July of that year. Upon completion of this course he entered the railway department at East Pittsburgh and remained there until 1911, when he came to the Boston office as railway engineer. In 1913 he became a railway salesman, located in the Springfield, Mass., office, and two years later went to the New Haven, Conn., office as railway and central station salesman. He was made manager of the transportation division at Boston in September, 1922, and manager of the New Haven, Conn., branch office in 1924, which latter position he leaves to return to Boston as district manager.

Ross L. McLellan, formerly managing director of C.a. Westinghouse Electric Internacional, S. A., has been appointed general manager of the Westinghouse International Co. with headquarters in New York. Mr. McLellan, whose appointment was effective April 1, arrived in New York recently from Buenos Aires and immediately assumed his new position.

John S. McMillan, president of the Roche Harbor Lime and Cement Co., Seattle, Wash., has taken an active part in the Pan-Pacific conference on education, recreation, reclamation and rehabilitation recently held in Honolulu, H. I. Mr. McMillan represented the United States as a delegate-at-large and the Seattle Chamber of Commerce as a special delegate. He writes that the meeting was wonderfully instructive and interesting, delegates from all the states and countries bordering upon the Pacific ocean being present. The conference itself, he adds, did a vast amount of constructive work along the lines of subjects indicated above.

Obituaries

Edward B. Manley, Rockton, Ill., for the past 15 years proprietor of the Manley Sand Co., died recently after a short illness.

Manufacturers

International General Electric Co., Schenectady, N. Y., announces the election of Gerard Swope, president of the General Electric Co., as chairman of the board, succeeding the late Anson W. Burchard. Clark H. Minor was re-elected president; Walter J. Edmonds, comptroller, was elected a new vice-president in charge of financial relations, and E. F. Colyer was named comptroller. Dwight W. Morrow, of J. P. Morgan & Co., and Victor M. Cutter, president of the United Fruit Co., were also elected directors of the International General Electric Co.

Climax Engineering Co., Clinton, Iowa., announces the appointment of Jack Redfern as sales representative.

Mundy Sales Corp., New York, N. Y., announces the appointment of the Funkhouser Equipment Co., 2405 Jefferson St., Kansas City, Mo., as exclusive distributors for that territory, and the Johnson-Beckwith Machinery Co., Union Bank Bldg., Davenport, Iowa, as exclusive distributor for this territory.

Marsh-Capron Co., Chicago, has appointed the following new dealers: National Machinery and Equipment Co., 91 Connecticut St., Seattle, Wash.; Marble, Cement and Coal Co., Southern Ave. and Pennsylvania R. R., Muskegon, Mich.; S. M. Caldwell, 406 Mead Bldg., Rockford, Ill.; A. W. Sikking & Co., 116 N. 6th St., Springfield, Ill.; R. S. Smilie, Wells-Fargo Bldg., San Francisco, Calif.; Burke Machinery Co., Porter Bldg., Portland, Ore. Stocks of repair parts will be carried by Ben Nieboer, 1011 Sherman St., Grand Rapids, Mich., and Bashford-McCord Corp., 1346 University Ave., Rochester, N. Y.

Kensington Steel Co., Chicago, Ill., announces the appointment of Arthur Whitcraft as eastern sales manager with headquarters at Port Ewen, N. Y. Mr. Whitcraft has been engaged in the manganese steel foundry business continuously during the past 17 years. His experience includes manganese steel foundries employing both the converter and the electric furnace processes.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn., formally opened the new Wilkes-Barre, Penn., building on April 26 last. Leading industrialists, mining men, electrical engineers and business men joined with the officials of the Westinghouse company from Philadelphia and took part.

Lincoln Electric Co., Cleveland, Ohio, announces the appointment of Royal D. Malm as western district sales manager, with headquarters at Chicago. Mr. Malm is an engineering graduate from Case School of Applied Science, Cleveland, Ohio, class of 1912.

Brown Instrument Co., Philadelphia, Penn., has just established a midwestern repair and service station at 217 E. Illinois St., Chicago. A regular stock of recording instruments, charts, repair parts, etc., will be carried to service the Middle West. Repair work on Brown instruments will also be made at this station.

Massillon Power Shovel Co., Massillon, Ohio, announces the purchase of the power shovel division of Russell & Co. and the plant and business of the Massillon Foundry and Machine Co., both of Massillon, Ohio.

Reeves Bros. Co., Birmingham, Ala., has recently shipped two of the world's largest rotary cement kilns to the Pennsylvania-Dixie Cement Corp. plant at Richard City, Tenn. The kiln dimensions are 10 ft. by 11 ft. 3 in. in dia. and 343 ft. 9 in. in length. The total weight of each kiln, including machinery, is about 575 tons. Eight special flat cars were required for shipment of the kiln shells. The company is almost ready to ship four rotary kiln sections, each 10x130 ft., and four rotary cement kiln coolers, 9x80 ft., to the Republic Iron and Steel Co., Birmingham, Ala.

Austin Co., Cleveland, Ohio, has opened a branch office in the Dixie Terminal Bldg., Cincinnati, Ohio, with H. L. Cornelison in charge.

Novo Engine Co., Lansing, Mich., has appointed the Construction Equipment Co., Columbia, S. C., distributors for the state of South Carolina and the San Antonio Machine and Supply Co., distributors for South Central Texas.

Climax Engineering Co., Clinton, Iowa, announces the addition to its sales organization of H. P. McCullough, 328 Chronicle Bldg., Houston, Tex., and E. H. Crippen, 4023 West 7th St., Fort Worth, Tex.

General Electric Co., Schenectady, N. Y., announces the following new appointments H. A. Couse, a member of the law department of the General Electric Co., as general counsel of the incandescent lamp department, with offices at 120 Broadway, New York City, with Philip D. Reed as an associate, and F. H. Babcock, of the central station department, to the position of assistant to Charles W. Appleton, who was recently elected vice-president in charge of general relations with public utilities.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention ROCK PRODUCTS.

Cement Products Improver. Bulletin on "Rex," an admixture for cement products to improve whiteness, induce rapid set, shorten curing time, increase workability, etc. Data on laboratory tests and recommended practice. WOODVILLE LIME PRODUCTS CO., Toledo, Ohio.

Low Temperature Carbonization of Coal. Bulletin **IC-3** on the KGS process. Describes and illustrates plant layout at Essen, Germany, and gives data on fundamental principles. INTERNATIONAL COMBUSTION ENGINEERING CORP., New York, N. Y.

What Mechanical Handling Has Done—and Is Doing—for Industry. Booklet No. **939**, a reprint of an article by Charles Piez, chairman Link-Belt Co., published in Industrial Management, August, 1926. LINK-BELT CO., Chicago, Ill.

New and Used Equipment. Bulletins on new and used rock products equipment in stock at the ROSS POWER EQUIPMENT CO., Indianapolis, Ind.

Steel Storage Bins. Bulletin on circular and rectangular steel bin units of self-cleaning type up to and including 630 tons capacity, equipped with batching devices for measurement of sand, stone and other material. Construction data and details of design, uses, etc. BLAW-KNOX CO., Pittsburgh, Penn.

Power Hoe. Bulletin No. **666** on the improved drag scraper for handling and reclaiming of bulk materials in and out of storage piles. Typical installations, data on design and construction, etc. LINK-BELT CO., Chicago, Ill.

Stripper Machines. Bulletin illustrating and describing strippers of the single and doube power types, inverted stripper for catch-basin block, tile machines, etc. Data on block types, etc. ANCHOR CONCRETE MACHINERY CO., Adrian, Mich.

Steam Generating Units. Publication **1C-2** illustrating and describing the remodeled unit No. 2 of the Fordson plant of the Ford Motor Co. INTERNATIONAL COMBUSTION ENGINEERING CORP., New York, N. Y.

Blowers for Oil Burners. Bulletin No. **1033** on Sirocco blowers for domestic oil burners. AMERICAN BLOWER CO., Detroit, Mich.

Lift-Trucks Platforms. Bulletin on designs of equipment for various purposes. BARRETT-CRAVENS CO., Chicago, Ill.

Dragline and Slackline Hoists. Bulletin No. **130** describing and illustrating hoists for slackline and dragline excavators, with electric, steam or gasoline engine drive. Data on construction, capacity, etc. MEAD-MORRISON CO., Boston, Mass.

Spur Gear Speed Reducers. Second edition of catalog No. **26**, containing useful data on capacities, mechanics, etc. W. A. JONES FOUNDRY AND MACHINE CO., Chicago, Ill.

Dry Grinding with Air Classification. Bulletin No. **17A** on dry grinding with Hardinge conical mill and reverse current air classifier. Diagrams, illustrations and data on principles of air classification and control. HARDINGE CO., York, Penn.

Temperature Control. Brochure on application of recording pyrometers and thermometers in the control of various products. BROWN INSTRUMENT CO., Philadelphia, Penn.

Illumination Data. Bulletin **LD155** containing definitions of illumination terms, technically correct and simply put for the non-technical reader. Diagrams, illustrations, etc. EDISON LAMP WORKS of the GENERAL ELECTRIC CO., Harrison, N. J.

Burning Powdered Coal Under Steam Boilers. Paper presented before the International Conference on Bituminous Coal at Pittsburgh by Henry Kreisinger, research engineer. COMBUSTION ENGINEERING CORP., New York, N. Y.